FINDING OF NO SIGNIFICANT IMPACT

AVIAN PREDATION DETERRENT PROGRAM
LOWER COLUMBIA AND LOWER SNAKE RIVERS

September 2005

The Corps of Engineers (Corps) proposes to implement an annual Avian Predation Deterrent (APD) program at eight of its hydroelectric dams on the lower Columbia and lower Snake Rivers during the juvenile salmonid outmigration season. These dams comprise part of the Federal Columbia River Power System (FCRPS). The Walla Walla District of the Corps would be responsible for implementing the program at Ice Harbor, Lower Monumental, Little Goose, and Lower Granite dams on the lower Snake River and at McNary Dam on the lower Columbia River. The Portland District of the Corps would be responsible for implementing the program at Bonneville, The Dalles, and John Day dams on the lower Columbia River.

The goal of the deterrent program is to implement the most practical and effective solutions for reducing piscivorous (fish-eating) bird usage in areas near the dams where juvenile salmonids are susceptible to predation. The purpose of the program is to implement Reasonable and Prudent Alternative (RPA) action 101 of the National Marine Fisheries Service (NMFS) Final Biological Opinion on the Reinitiation of Consultation on Operation of the Federal Columbia River Power System (FCRPS) (2000). RPA 101 states the Corps shall implement and maintain an effective means of discouraging avian predation at the FCRPS dams where avian predator activity is observed. The Corps has been using various avian deterrent methods at the dams for several years. However, because of RPA 101, the Corps decided to re-evaluate these activities and propose a more formalized program. The proposed program entails implementing and maintaining an effective means of discouraging piscivorous bird predation at all forebay, tailrace, and bypass outfall locations at the Corps' dams on the lower Columbia and lower Snake Rivers.

The Corps proposes to implement the program under the authority of the laws authorizing the construction and operation of the various Federal dams. For McNary, Ice Harbor, Lower Monumental, Little Goose, and Lower Granite dams, the authority is the Flood Control Act of 1945 (Public Law 79-14). For Bonneville Dam, the authority is the Federal Emergency Administration Act of 1933, the River and Harbor Act of 1935, the Bonneville Project Act of 1937, and the Flood Control Act of 1950 (PL 81-516). For The Dalles and John Day dams, the authority is the Flood Control Act of 1950 (PL 81-516).

The Corps prepared an Environmental Assessment (EA) to evaluate the potential effects of the APD program on environmental resources in and near the project area. The EA was prepared for both Walla Walla and Portland District jurisdictions to provide a comprehensive analysis for the entire program. This EA is tiered off the 1995 Columbia River System Operation Review Environmental Impact Statement (EIS) and the 2002 Lower Snake River Juvenile Salmon Migration Feasibility Report/EIS and these EISs are incorporated by reference.

The Corps evaluated five alternatives in the EA. These were 1) No Action/No Change (Current Program); 2) Non-Lethal Tools Only; 3) Exhaust all Non-Lethal Tools First; 4) No Corps

Program; and 5) Lethal Tools Only. Alternative 2, the Non-Lethal Tools Only Alternative, is the Corps' preferred alternative. This alternative has several components, including:

- Using Animal and Plant Health Inspection Services - Wildlife Service (APHIS-WS) and/or other qualified technical assistance.
- Using all practical and effective non-lethal control methods.
- Evaluating and using new National Wildlife Research Center and/or other agency approved wildlife damage management tools developed through research.

Visual deterrents, auditory deterrents, and exclusion are control tools that would be employed under the preferred alternative. Tactile, chemosensory, and physiologic deterrents, habitat modification, translocation, contraceptives, egg addling, and avicides are control tools that are available, but not currently considered for use under the preferred alternative. The Corps would use avian deterrents annually during the juvenile salmonid outmigration season, which is generally between April 1 and August 31 each year.

Alternatives 1, 3, and 5 were not identified as the preferred alternative because there was inadequate scientifically valid data at this time to support the need for lethal take which is an element in each of these alternatives. Alternative 4, the No Corps Program, would not respond to RPA 101 and would not address the Corps' responsibility to reduce predation on juvenile salmonids. Should it be determined that hazing, in conjunction with other non-lethal measures is ineffective in deterring avian predators, then the Corps may implement a research effort in 2006 or later to determine the efficiency and need for lethal take of avian predators. Further NEPA documentation would occur prior to use of lethal take as a future annual APD measure.

The proposed APD program would have impacts on birds and recreation, although none of them would be considered significant. Most of the impacts would be to individual birds of target and non-target species. These birds would expend additional energy moving away from the dams in response to the deterrents or foraging for food in other locations. The overall population of the species would not be adversely affected. Recreation in the form of bird viewing at the dams may be reduced by deterrent efforts, as fewer birds would be seen in the immediate vicinity of the dams.

The Corps prepared a biological assessment (BA) evaluating the effect of the APD program on species listed as threatened or endangered under the Endangered Species Act. The BA evaluated the effects of the APD program on terrestrial species, and anadromous and non-anadromous fish species. In the BA, the Corps determined that the program "may affect, but is not likely to adversely affect" bald eagles or bull trout. The Corps sent the BA to the U.S. Fish and Wildlife Service for their concurrence and received a concurrence letter from them on April 23, 2003. The Corps determined the APD program "may affect, but is not likely to adversely affect" Snake River spring/summer and fall Chinook salmon, Snake River sockeye salmon, and steelhead; Upper Columbia River spring Chinook salmon and steelhead; Lower Columbia River chum salmon, Chinook salmon, and steelhead; and Middle Columbia River steelhead, and have no effect on other listed species. This determination was coordinated with the National Marine Fisheries Service as outlined in their June 5, 2001 letter regarding consultation procedures for implementing action items required by the 2000 FCRPS Biological Opinion.

The Corps evaluated the effects of the APD on cultural resources. The Corps determined there was "no potential to cause effects on historic properties" at any of the dams, except McNary, because the project (installing additional bird wires) would occur on structures that were not historic properties, or would not add structures to historic properties. For McNary Dam, the Corps prepared a Cultural Resource Inventory Report and determined the proposed bird exclusion system (bird wires) would not alter the appearance of the structure or their characteristics, in such a way that would make it ineligible for the National Register of Historic Places. The Corps coordinated its determinations with the Washington Office of Archeological and Historic Properties (OAHP) and Oregon State Historic Preservation Office (SHPO). The OAHP provided their concurrence in a letter dated April 7, 2003, and the SHPO has expressed not to expect response correspondence from them for routine matters.

The Corps sent letters to the affected Tribes to initiate informal government-to-government consultation for the APD program. Letters dated March 3, 2003 were sent to the Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Tribe, Confederated Tribes of the Colville Reservation, Confederated Tribes and Bands of the Yakama Indian Nation, and Confederated Tribes of Warm Springs. A letter dated March 25, 2003 was sent to the Cowlitz Indian Tribe. The Corps provided copies of these letters to the Columbia River Inter-Tribal Fish Commission. The Corps did not receive any response to the letters.

The Corps evaluated the cumulative effect of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what other agency or person undertake the other actions. The Corps determined that when taken together with these actions, the proposed program would have no significant environmental impact. The United States Department of Agriculture also made this finding for their piscivorous bird damage management program on a regional (State of Washington) and national level.

The technical and environmental aspects of the proposed APD program were evaluated in the program EA. The project has been coordinated with Federal and state agencies, Tribes affected governments, and the public. Public comment was received on the draft EA and Draft FONSI during the public comment period from March 5 to April 16, 2004. The comment period was extended beyond the normal 30-day review period in response to a request for additional time to review 2003 haze and kill data tables 1 through 9, which were posted on the Corps' NEPA web site midway through the comment period. Ten comment letters were received, and a comment response package, which provides the Corps' response to these comments and the amended Appendix G tables 1 through 9, is included as an attachment to this FONSI.

I have taken into consideration the technical aspects of the project, best scientific information available, public comment, and determinations of the EA. Based on this information, I have determined that the overall projected effects of this proposed action are beneficial and, based on the information provided, would not result in significant impacts to the quality of the human environment. Therefore an Environmental Impact Statement is not required for the development and implementation of the preferred alternative, the Non-Lethal Tools Only alternative.

DATE: 5 October 05

//signed//
Randy L. Glaeser
Lieutenant Colonel, Corps of Engineers
District Engineer
Walla Walla District

Comment Response Package

RESPONSE TO COMMENTS
Avian Predation Deterrent Program, Corps of Engineers Dams on the Lower Columbia and Snake Rivers

The Corps received 10 comment letters in response to its March 5, 2004 Interested Party letter for its Environmental Assessment dated March 2004. Proper consideration must be given to all reasonable points of view, particularly as they may relate to the issues being considered. In this light, we are acknowledging, considering, responding to, and addressing the comments, concerns, issues, and/or criticisms that have been provided. Table 1 below is a summary of the comments with the corresponding Corps responses. Tables 2 through 6, located after the end of Table 1, were provided during the comment period. Appendix G Tables G-1 through G-9, which were amended to provide 2003 data during the comment review period, are also provided at the end of this package.

Table 1. Comments and Responses

Comment	Comment#	Response
I am writing to request an extension for the comment deadline for the EA for the Avian Predation Deterrent Program on the Lower Columbia and Snake Rivers. We have requested information from the USDA Wildlife Services office as to the exact number of each bird species that was killed in 2003. Thus far we have been unable to access this information. It is scientifically impossible to fully analyze the impacts on bird populations without the most recent data. Therefore, we are requesting you to postpone the comment deadline from April 5th until we can gain access to that information. The EA references many other documents that need to be considered in order to evaluate the EA. The deadline for comment period needs to be extended in order to evaluate the following documents which were "incorporated by reference" into the EA: Columbia River System Operation Review EIS (CORPS et al. 1995), Lower Snake River Juvenile Salmon Migration Feasibility Report/EIS (CORPS et al. 2002a), and the Final Biological Opinion on the Reinitiation of Consultation on Operation of the Federal Columbia River Power System (NMFS BiOP 2000).	2, 6.5, 6.6	The comment deadline was extended, as requested, in order to allow additional time to review and comment on the 2003 haze and take data that were posted on the Corps' Internet website. We believe that the 2003 data show a continuing trend of fewer birds killed and more birds hazed. Additional figures 1 through 19 are provided at the end of this comment response package that illustrate the downward take trend for gulls, cormorants and grebes at individual dams, and in total.
I have reviewed both the "Finding Of No Significant Impact for the Avian Predation Deterrent Program Lower Columbia and Lower Snake Rivers" and the "Environmental Assessment, Portland District, Avian Predation Deterrent Program for the Protection of Salmonids, Lower Columbia and Snake Rivers Dams, Washington and Oregon". I find that your finding is without basis, primarily based on inadequate data collection, erroneous	3.1, 3.2	Comment noted. Based upon comments received, we have selected Alternative 2 – Non-Lethal Tools Only as our preferred alternative to accomplish O&M avian predation deterrence at the Corps structures.

Comment	Comment#	Response
assumptions, and poor science. You inadequately monitored avian-caused salmonid mortality with extremely limited research results and inappropriate assumptions.		
The results do not provide adequate information on the viability of the fish after passing through turbines, pipes, and other passageways, including effects of both trauma and gas-bubble effects. Therefore, any estimate of salmonid mortality directly due to bird predation is invalid.	3.3	The Avian Predation Deterrent program is designed to deter birds from feeding on juvenile salmonids around dams. The methods currently used do reduce the number of birds feeding near the dams. As the commenter suggests, we do not know exactly how much the program helps the species we are trying to protect.
There is little to no information on the proportion of species of fish being predated upon, what percentage are salmonids, or the proportion of wild vs. hatchery salmonids.	3.4 , 8.7, 8.8	Comment noted. The issue of wild versus hatchery salmonids is beyond the scope of analysis of this EA.
There are inadequate data on the species of birds causing the mortality, particularly which bird species are causing impacts on which species of salmonids.	3.5	Comment noted. The issue of which bird species are causing impacts on which species of salmonids is beyond the scope of analysis of this EA.
The bird mortality is inadequately monitored, as species are frequently not identified. The EA states that 3,275 unidentified gulls were killed implying that species that are not described in the report may have been taken. There also are no reports as to whether birds were injured without being immediately killed, implying mortality is underestimated. Therefore, any analysis of impact to species is not valid.	3.6	All of the unidentified gulls that were killed were killed at John Day or The Dalles dams in 1997 or 1998. Most, if not all, of these gulls were likely either Ring-billed, California, or Herring Gulls. Additional bird identification training has been provided to WS staff since 1998, which has substantially reduced the number of unidentified birds. If a bird appeared to have been hit, it was counted as killed. There is potential for delayed mortality from a small percentage of birds that could be wounded, and not reported as hit, but later die. It is important to note that, while this would increase the number of birds killed by APHIS, bird population estimates would remain unchanged and represent the population that survives from all types of predation, injury and disease. So this is not an additional effect to the bird populations.

Comment	Comment#	Response
The numbers presented do not take into account the total mortality for birds in the region, both taken under permit and by other means.	3.7a	The phrase "by other means" is not defined by the commenter, but is assumed to include mortality caused by predators, disease, and age. The EA presented the number of birds killed at the Corps dams and the total number of birds killed by WS in Washington in our cumulative effects analysis. The cumulative effect analysis reviewed impacts from other past, present, and reasonably foreseeable future actions. We did not include natural mortality factors, as the project does not affect these, and they are built into the baseline condition for bird populations.
Table 6-1 of the EA shows much higher numbers of birds taken than those recorded earlier in the report.	3.7b	Table 6.1 is located in the cumulative effects section. The table includes birds that are killed under all permits issued in the State of Washington. The numbers recorded earlier in the report reflect only those killed at the 8 Corps dams. Therefore, one would expect Table 6.1 numbers to be higher than numbers presented earlier.
The data sources for estimating bird population trends are inadequate. The Breeding Bird Atlas is incomplete for the region and is not conducted to the rigorous standards nor repeated at an adequate interval to determine population trends. The Christmas Bird Count is a non-professional snapshot of birds in a small area during a very limited time-period and does not reflect the multiple variables that affect a single count. Statistically, the data are insufficient to establish population trends. Therefore, the population trends stated in the EA are without scientific basis.	3.8	Data from the Breeding Bird Survey and the National Audubon Society Christmas Bird Count were used primarily as a historic reference. These datasets were not the only source of information used to determine population trends and conclusions on impacts were not reached based on those data alone for any species.
The EA states that diversion method will be extended to areas not currently covered. This indicates that not all non-lethal methods have been fully utilized, a failure to pursue all non-lethal methods.	3.9	The existing program was not based on Alternative 3, but Alternative 1 in which lethal methods are sometimes used to remove persistent individual birds.

Comment	Comment#	Response
In conclusion, despite the obvious fact that the dams are the cause of all increased salmonid mortality, whether caused by the physical duress of passing the dam or by creating a zone of disoriented, stunned, injured, and dead fish that can easily be predated upon by birds, the solution proposed is to kill the birds instead of expending all efforts to modify the dam and water-flow processes. The inadequate and poor science presented in the EA in no way justifies that the continued take of birds has no significant impact.	3.10	The Corps and others continually monitor and improve upon methods to safely move fish past the dams. The dams are in place for more than one purpose. Compromises between purposes are necessarily made to obtain the highest overall benefit. We cannot ignore the problem of avian predators feeding on juvenile salmonids near the dams. We considered the available data and continue to gather new data to make the Avian Predation Deterrent program effective, while minimizing negative impacts on bird populations.
'I feel strongly that the best action to be taken to diminish juvenile salmonid mortality is to try every other option before we try lethal control of fish-eating animals that share the river with the salmonids. I think the EA makes it clear that there are other options and that the answer does not necessarily lie with shooting thousands of piscivorous birds in the river system.	4.1	Comment noted. We will implement in 2005 and subsequent years non-lethal measures that are practicable, implementable and cost-effective. We will implement a study in 2005 at Bonneville, The Dalles and John Day dams to evaluate the effectiveness of hazing, in conjunction with other non-lethal measures already in place, as a means to deter avian predators at these dams. Should the study results indicate that hazing is inefficient throughout or during portions of the juvenile outmigration period, we will implement research efforts in 2006 or later to determine the efficacy and need for inclusion of lethal take in conjunction with non-lethal measures to deter avian predators at Corps dams. We will release the results of a study of lethal take, if implemented, and conduct further NEPA clearance prior to incorporating lethal take into our O&M avian predation deterrence program at Corps dams.
The primary recipient of lethal control methods at the dams are clearly gulls. "Gulls ... take a minimum of tens of thousands of migrating smolts every year (Jones et al. 1998)." (p. 32). Tens of thousands of smolts are not a large proportion of the hundreds of thousands to millions of smolts that	4.2	Gulls are opportunistic feeders. We try to discourage them from feeding around the dams to protect juvenile salmonids. We do not know how many more salmonids would be eaten if we did

Comment	Comment#	Response
make this migration; over a million hatchery fish alone are released into the river system each year.		nothing to deter the birds, but believe it would be much higher than the level with the program in place based on the correlation between increased numbers of gulls feeding when increased numbers of juvenile salmon are present at the dams. We will continue to monitor the effectiveness of the program and make adjustments where necessary. See 4.1 for further information.
I question the basic premise of the EA, that predator control is effective in this case. Good science could be convincing that salmonid populations actually are enhanced by the removal of some few thousands of gulls and other piscivores each year, but there has been no such science. There has also been none to show effects of this same deterrence on populations of the fish-eaters!	4.3	Local bird population data was provided to us by the USFWS (Table 6) and a summary is included in this comment response package in Table 2. An analysis of the population data versus the number of birds killed at the nearest dams was conducted. This analysis does not take into account any other source of bird mortality. Much of the population data for gulls was combined for ring-billed gulls and California gulls. So in our analysis, we combined the take numbers for those species as well. The results of the analysis indicate that the Corps Avian Predation Deterrent program may have had a negative effect on gulls from the gull colonies near Bonneville and The Dalles dams (Little Memaloose and Miller Rocks) and from the Three Mile Canyon (between John Day and McNary) population. The percent of birds taken from the local population near Bonneville and The Dalles varied annually from 38.6% to 1.6%. The local population of breeding gulls ranged from a high of 6,611 in 1997 to 2,380 in 2002. See response to 4.1. The percent of birds taken from the local population near John Day and McNary ranged from 15.9% to 1.1%. The local population of breeding gulls ranged from a high of 18,627 in

Comment	Comment#	Response
		1997 to 9,100 in 2002. There did not seem to be an effect on gull populations near the Snake River (Crescent Island, Richland Island, Island 18) where the percent of birds taken from the local population was less than 1 percent. The local gull population fluctuated from a high of 50,392 in 1998 to 42,366 in 2001. The potential negative effect on gull colonies near Bonneville and The Dalles dams is not considered to be a significant environmental effect. It is interesting to note that while gull take at these dams decreased from 1999 to 2002, there is not a corresponding increase in gull population. Future predation permits issued by USFWS are expected to set take limits at each dam, to ensure the APD program does not pose a significant environmental effect.
Two human-caused factors conspire against the fish-eating birds discussed here, both attracting and concentrating them to the point at which they have reached "pest" status. 1) One of these factors is the "hatchery problem." Hatcheries are now putting salmonids into the river system in much greater numbers than are reached by native runs, thus making the river much more attractive as feeding grounds for piscivores than it would be without the addition of hatchery fish. Some of the fish-eaters are called "anthropogenically abundant" in the EA, but their abundance is only perceived because of these high local concentrations; none of these species is more abundant than it was at the time of settlement of North America! 2) There is also a "dam problem." The dams are responsible for both the concentrations of smolts and for making them much more vulnerable to predators. The following two quotes represent only a small part of the documentation of this in the EA: "Juvenile salmonids are especially	4.4, 4.5, 4.6	The Corps does not control the number of hatchery fish that are released into the rivers, but the Corps is responsible for getting them, and wild fish, safely past the dams. One aspect of achieving safe passage is an effective program to deter avian predators. The commenter did not provide historic data on the local populations of piscivorous birds relative to the Corps dams. We have not been able to compare historical populations levels with levels seen today.

Comment	Comment #	Response
vulnerable to predation by birds and other predators when released at the bypass facilities or brought to the surface of the tailrace, and some suffer additional predation because they are disoriented or stunned due to passage through turbines, spillways" (p. 9). "Because dam passage is a stressful event (Specker and Schreck 1980; Matthews et al. 1986; Maule et al. 1988; Abernethy et al. 2001), there is concern that juvenile salmonids passing through dams would not be able to cope with subsequent stressors, such as predators (Mesa 1994)" (p. 31). The "dam problem" and the "hatchery problem" are assured to go on, and fish-eating birds are thus assured to be attracted to the dams, where vulnerable small fish are concentrated. Without a solution to either of these "problems," there is no long-term solution possible without a severe reduction in populations of the birds in question, and thus over the long haul, these control methods will either (a) fail, or (b) cause reductions in bird species protected by the US Migratory Bird Treaty Act and other laws.		
I find comments on p. 31 particularly significant: Measures planned to improve juvenile survival include: Increased flow augmentation for summer migrants, particularly in the low water; Management of reservoir and run-of-river projects to reduce extreme water level fluctuations; Management of predator populations (fish, birds, and mammals); Implement passage measures which move fish quickly through the forebay and tailrace of dams. There are thus four measures outlined that should improve juvenile salmonid survival. Logic would tell us that the three of them purely for the benefit of the salmonids be tried before trying the fourth (predator management), to the detriment of other species that are protected by law. The gain in trying all other methods first seems clear to me.	4.7, 4.8	Methods for managing the system better for fish survival are continually being tested and revised. It is not a simple matter to determine how successful the methods are at protecting juvenile salmonids. The Corps tries to make improvements to all areas that affect fish survival, including management of predator populations.
I believe this EA has so much speculation in it that it should not be considered a valid rationale for the "No Action" alternative. Of course "No Action" is a complete misnomer, as the killing of thousands of birds otherwise protected by law is a very severe action. The statement "The scope	4.9	"No action" has two common meanings: 1) Continue the present management activities and 2) don't do anything. The EA clearly points out that the No Action alternative is to continue the

Comment	Comment #	Response
of this proposal and the number of piscivorous birds that might be removed under any of the alternatives carried forward would result in very low or negligible direct or indirect impacts" (p. 63) has in fact no scientific evidence to back it up.		current APD program. If we were to completely stop all lethal take of avian predators, we believe that the effectiveness of the program may decrease but we do not have research results to support this premise. However, we will not implement lethal take as an O&M measure for avian predation deterrence in 2005 or subsequent years unless we determine its necessity and effectiveness. We will conduct a research effort in 2005 at Bonneville, The Dalles and John Day dams to determine if hazing, in conjunction with other non-lethal measures already in place at these Corps structures, is an efficient method to deter avian predators. Should we determine from the results of the 2005 investigation that hazing and other non-lethal measures are not effective during all or a portion of the juvenile outmigrant period, we will implement a research effort to evaluate the effectiveness and need for limited lethal take of avian predators at Corps dams. We will release the results of a study of lethal take, if implemented, and conduct further NEPA clearance prior to incorporating lethal take into our O&M avian predation deterrence program at Corps dams.
I believe the avian predation deterrent program on the Snake and Columbia River should be halted immediately. It is ludicrous to equate the random shooting of a variety of avian species with taking effective measures to restore NW salmon populations. Many of the birds that you are targeting are legally protected species, and the random slaughter by agents untrained in the fine points of bird identification may result in removal of species which	5.1, 5.2	Comment noted. The US Fish and Wildlife Service is responsible for determining appropriate levels of take levels for the program to ensure that regional piscivorous bird populations remain healthy and viable.

Comment	Comment #	Response
may themselves have low population levels. Aside from this, it is just plain wrong to slaughter birds that are only using a feeding opportunity that has become available thanks to man-made changes to the environment.		
Some issues that fraught this venture with uncertainty include the poorly planned and documented need, as well as its effectiveness. How many salmonids are these target birds actually feeding on? Where are they coming from? Are they eating healthy fish, or just fish dead or dying thanks to the inefficient fish-passing systems at these dams? Do the people who have formulated this program have any idea which bird species are actually taking which percentage of salmon, or is the whole project just a shot in the dark.	5.3	Comment noted. The Corps is considering a research proposal to evaluate gull presence and number of fish captured when gulls are, and are not, killed. Whether the fish are alive or dead, and whether the prey is salmon, is difficult to determine. Examination of stomach contents can identify the species, but does not say where the prey was captured, or whether it was alive, dying, or dead at time of capture. See response to 4.1.
It is time to stop scapegoating other species for man-made disruption of the natural system. If you really want to help salmon, why don't you improve the fish-passing systems and restrict catch limits?	5.4	Comment noted. Improvements to the fish passage systems are continuous. The Corps has no control over catch limits.
The whole plan is an outrage, and is a good example of why citizens have lost faith in the federal government.	5.5	Comment noted.
The following major categories of problems that need to be reconsidered in a formal EIS: 1. PNW salmonid ESUs currently are being reviewed by NMFS with decisions scheduled for 2004-2005. Runs consisting of hatchery and stream spawned fish will probably not meet ESU criterion. Check the status of the runs the EA proposes to protect. PNW salmonid ESUs currently are being reviewed by NMFS: ESA status for some of the salmonid runs that the EA proposes to protect are now in review by NMFS as a result of a federal court decision that might invalidate most salmonid ESU listings on the West Coast. The ruling identified a fundamental problem in NMFS policy that artificially distinguished between stream vs. hatchery spawning salmon that comprise the same run. NMFS'	6.1, 6.6, 6.7	The draft EA has provided reasonable alternatives and the resulting environmental impacts of the alternatives for this project. The final EA and responses to comments provide additional information on the environmental considerations and other issues regarding the project so that the federal decision makers can determine the significance of impacts. All of the ESA listed fish discussed in the EA were still listed at the time of this analysis. While there is speculation that the listing status of some ESUs may be changed, there has been no official

Comment	Comment #	Response
review of ESU status will be released in 2004-2005. Some ESU designations will likely be retained, but this area of uncertainty needs to be considered when assessing the benefits of the action proposed in the EA. For legal overview of the Alsea decision, see: http://www.law.seattleu.edu/lawrev/vol25/254/lewallen_brooks.html?mode=standard NMFS letter re review, see: http://www.nwr.noaa.gov/occd/update0803.html Estimates of predator populations are inadequate thus the impact of kills cannot be assessed.		change to the listing status of any of the ESUs discussed in the EA to date.
2. Populations of predators both in number and geographical extent are defined in a confusing manner. There are better data on numbers and colonies. Provide data for within the region of the COE dams and for the entire region for breeding and for migrants. The Geographic Extent (Sec 4.0.1.2) of the EA is given as the Columbia River (CR) mi 140 to Snake River mi 108. However in Appendix G, Table A, the Caspian tern population includes East Sand Island, which is 140 mi from the western most dam included in this EA. The large East Sand Island population should be excluded. Solstice Island (Potholes Reservoir) could also be excluded as it is about 60 mi north of the extent given in Sec 4.0.1.2. An additional error is that Potholes only has about 500 individuals not the 1,153 listed in Table A (see Collis et al at columbiabirdresearch.org and Seto-FWS survey results). A more realistic population estimate for terns in the area of the eight dams is 1,200 terns at Crescent Island. Appendix G, Table A lists only 5810 gulls nesting in the region? This seems low, but I didn't have time to check the gulls or other species numbers. However, based on the terns, all the data need to be independently verified. More thought has to be given to population size and geographical extent of predators.	6.2, 6.8, 6.9, 6.10, 6.11	Table A of App. G was mistakenly presented as specific colony population data based on a draft report. This information is actually the number of Passive Integrated Transponder (PIT) tag codes recovered in each of the locations. The number of PIT tag codes recovered at the tern colony on Crescent Island was 11,155, not the tabled 1,160 and the number recovered from East Sand Island was 23,062, not 19,866 as reported. Table 2 of this comment response package contains the estimated gull breeding population for locations within the Lower Columbia and Snake River region.

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Without reliable data, it is not possible to assess the impact of the kills. From the outset the EA is flawed because the size of the area and thus the size of the predator populations are in doubt. The EA attempts to limit the impact of kills by consider only the eight COE dams, but ecologically this makes little sense. I would suggest redoing the EA and including the entire Columbia River system. The eight dams in this EA accounted for 10,800 birds killed during 1998-2002 (Sec 4) but the size/geographic extent of predator populations are unclear. However this is only a portion of predation control impacts in the Columbia system. In Sec 6 (Cumulative effects) 58,956 (additional?) birds were killed by Washington (state) WS (Table 6.1) using the same or similar rationale for control. From Table 6.1, species, yearly average, 6 yr total are: Calif. Gull, 1,869, 11,214; Ring-billed Gull, 6,228, 37,368; Herring Gull (?id), 253, 1,518; Double-crested Cormorant, 715, 4,290; Caspian Tern, 397, 2,382; Great Blue Heron, 141, 846; Com Merganser, 223, 1,338. I assume these do not include the 100's Caspian terns and WEGU/GWGU shot in the CR estuary as Table 6.1 deals with Washington (state) WS. For Caspian terns, control efforts kill 20-30% (allowing for some migrants) of the population 1,200 individuals per year. The other control effort are minimized in Sec 4.1.1.3 (p 4-12), "Caspian terns are hazed only, and therefore the program has a low impact on Caspian tern" by confining consideration to the eight COE dams considered in the EA. But a basin wide examination of control activities is needed by fully incorporating Sec 6 into the impact of control activities. Parsing the kills by dam and agencies diminishes the impact, which I assume was the point.		Comment noted The number of birds killed at the Corps dams (11,368 from 1997 to 2002) is included in the 58,956 birds killed by WS. While an average of over 2000 birds were killed per year at Corps dams between 1997 and 2001, in more recent years the average has dropped to 686 (694 in 2002 and 677 in 2003). As non-lethal deterrent methods have improved, the amount of lethal take has decreased.
3. The size and runs of fish that are being depredated are confused. What are the populations of ESA and non-ESA salmonids? The 180-200 million hatchery fish introduced yearly to the system are not mentioned. What proportion of the total is taken? How many are ESA fish? What are projected takes given no control; even 1-2 million fish would be insignificant	6.3, 6.13	Comment noted. The issue of wild versus hatchery salmonids is beyond the scope of analysis of this EA. The Corps does not control the number of hatchery fish that are released into the rivers, but the Corps has the responsibility to

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to the total. One can project a total take of salmonids (e. g., see Collis et al, Columbiabirdresearch.org), which would not approach significance. Hatchery fish. The end of Sec 3.2.3 is classic wildlife management from the past century (circa 1950's) that views predation and predators as harmful to the resource. In this section, there is discussion of predator populations exceeding historical trends due to anthropogenic (i.e., human caused) effects (termed "anthropogenic abundant"). As a result they need to be controlled. However the entire Columbia system is an anthropogenic ecosystem. The EA does not mention that hatchery releases of salmonids into the Columbia River system that range from 180-200 MILLION per year (http://www.nwcouncil.org/releases ; RMIS database). Depending on the state, 60-80% of these are for recreational use, tribal treaty obligation, and commercial fishery. The great majority of the salmonids eaten by piscivores (the EA should provide data) are these "anthropogenically abundant" hatchery fish. In the EA page 3.5 "no one has defined the exact number of ESA listed anadromous fish being consumed by avian predators" pretty much sums it up. In reading the section, it is clear that there are no inexact data either. The best estimate is "some" ESA salmon. Thus a fundamental flaw in the EA, and NMFS policy in general, is that there is little consideration of how many listed or non-listed fish are available, how many are being taken, what the impact of predation might be, or even how many predators are in the region. Thus as an Environmental Assessment, the document is inadequate.		get them, and wild fish, safely past the dams. One aspect of achieving safe passage is an effective program to deter avian predators. Comment noted.
4. The rationale for predator control in the EA and the presumed benefit is based primarily on internal computer modeling done by NMFS staff. There is an unknown relationship between the models and reality. Experimentation in the real world is required to valid the models. Finally, the underlying premise to the EA is that predator control can't hurt the resource. One is left to ask, Does predation control significantly benefit	6.4, 6.15	The initial rationale for predator control may have been based partially on modeling as the commenter suggested, however, research has shown that large numbers of juvenile salmon are being eaten every year by birds and fish. Continued research and monitoring will be conducted to better assess effectiveness of the

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salmonid populations? Some attempt is made at an economic analysis in the EA showing an economic benefit to predator control. This type of analysis is only legitimate if done by external auditors. An actual real world benefit is lacking.		avian predator deterrent program and the significance of the benefit to salmonids.
In addition to the reported kills, a correction factor needs to be added to account for wounding of birds that fly or glide off and then die. This is especially true for the use of steel shot (EA page 6-2). This could be as high as one additional bird for every two killed and reported. Estimates can be obtained from FWS waterfowl hunting statistics.	6.12	According to USFWS' Migratory Birds and Habitat Programs, Pacific Region, the crippling loss during waterfowl hunting seasons is about 20%. They expect the crippling loss by APHIS damage control specialists at the dams to be lower. It is important to note that, while including this effect would increase the number of birds killed by APHIS, bird population estimates would remain unchanged and represent the population that survives from all types of predation, injury and disease. So this is not an additional effect to the bird populations.
At the very least the hatchery fish must be entered into the assessment of predation impacts. Then one must consider the societal benefit in predator control to maximize the fishery. Not all the public are fisherpeople and many would rather have their public funded fish serve as forage for piscivores because they value and appreciate predators and the concept of ecosystem function.	6.14	Comment noted.
The timing of the proposed action described in the EA needs to be clarified and described consistently throughout the document. The EA includes references to control activities year-round, during the peak of migration, and one reference to work between March and July. Any control of piscivorous birds for the protection of out-migrating smolts of endangered and Threatened salmon should be implemented during the primary out-migration period (April-August). Timing may be further refined in consultation with USFWS staff in our Fisheries Division.	7.1	Lethal take would only be conducted, when necessary, from April through August, if future research determines there is a need lethal take, that it is an effective means of deterrence for avian predators and the appropriate NEPA compliance has been attained. Lethal take will not be used for avian predation deterrence for 2005 and future years under this NEPA

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		document. See also response to 4.1. This timing has been corrected in Section 2.1 of the document.
The Affected Environment section is focused on describing the bird control program rather than providing a description of the migratory bird resources potentially affected by the alternatives. We recommend this section be revised to better describe statewide and more local (i.e., Columbia River corridor) migratory bird resources. NEPA regulations require this approach because information describing the affected environment provides context for the proposed action, sets the stage for effects analysis in the Environmental Effects section of the EA, and allows decision makers and interested parties to better understand the consequences of the proposed action. We request that population estimates of the primary species potentially affected be presented along with a more complete description of the distribution of gulls and cormorants in the Columbia River corridor in relation to the project sites. We have included much of this information in our detailed comments (enclosed). Staff in our Migratory Bird and Habitat Program office are available to discuss the interpretation or use of this data for the purpose of describing the affected environment or in the analysis of impacts.	7.2, 7.3	A description of the migratory bird resources potentially affected by the alternatives are provided in Table 2 of this comment response section. The data provide estimated historical breeding bird population data from the USFWS. See comment number 4.3 for an analysis of the historical population data versus the number of birds killed at the nearest dams.
The proposed action for "secondary predators" needs to be clarified. Some sections of the document indicate lethal control of bird species defined as secondary predators is ongoing and will continue under the proposed actions. In other sections, it is stated that lethal take of secondary predators will not occur.	7.4	No lethal take as an O&M measure for avian predator deterrence will occur with implementation of the preferred alternative for this EA. See response to 4.1 regarding the potential for future use of lethal take. We will dip net and release, to the extent practicable, western grebes that occur in the juvenile bypass channels at McNary Dam and the gate wells at Bonneville and John Day dams.

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In the Environmental Effects section, the impact analysis for migratory birds, particularly the analysis of the magnitude of the action, is incomprehensible. The evaluation criteria is defined as the number of animals killed in relation to their abundance. We concur with this approach. However, the species by species analysis of the magnitude of the proposed action utilizes trend information gauged against the "... percent of the total depredation permit take". We cannot decipher this criteria or it's relationship to the definition of magnitude of impact to migratory birds. Also, although a more detailed approach to the analysis of the effects of take on migratory bird populations is included in Appendix G, it is not adequately incorporated or referenced in the EA.	7.5	Chapter 4 uses the same methodology as the USDA Mid Columbia Piscivorous Bird EA. For the "magnitude" component of the analysis, there are 2 factors considered; percentage of depredation permit take and population trend data. In all 3 species assessed, the take is greater than 66% of the depredation permit take, which defaults to using the population trend rating to determine the magnitude. Appendix G is part of the EA and supports and supplements the analysis and narrative provided in Chapter 4.
In our attached comments we provide extensive corrections and comments on Appendix G. We include the best available data on the distribution and abundance of gulls and double-crested cormorants nesting in Washington (including all known colonies in the Columbia River) and the best estimates of statewide gull and cormorant breeding populations. This data should be included in your assessment and used as a baseline on which to assess the magnitude of take at the statewide and more local (e.g., Columbia River Basin) project scales. This is a good example of why it is important to describe the resources that may be affected by the action, in the Affected Environment section, as suggested above in our second bullet. Please contact our Migratory Bird and Habitat Program office should you need assistance in utilizing this data in your analysis of the effects of proposed alternatives.	7.6	The summary data provided is included in this comment response package. Cursory analysis is provided in response to comment 4.3. We will not be implementing lethal take as a standard O&M APD measure under the preferred alternative selected in this EA. See response to 4.1 regarding lethal take as an avian predation deterrence tool.
As for the U. S. Fish and Wildlife Service's (Service) role in this action, we regulate the take of migratory birds under the authorities of the Migratory Bird Treaty Act (MBTA). We received a request from U.S.D.A. Wildlife Services, Washington State Office (Wildlife Services) on February 12, 2004, for a depredation permit to authorize the take of piscivorous birds, primarily gulls and cormorants, at hydroelectric facilities on the Columbia and Lower	7.7	Comment noted.

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Snake Rivers. The purpose of this requested permit is to reduce avian predation of endangered and threatened out-migrating smolts at sites where they are most vulnerable to predation (e.g., at the tailrace of dams). As described in the EA, Wildlife Services will conduct the avian predator deterrent program proposed for the eight hydroelectric facilities operated by the Corps. Wildlife Services will also conduct similar avian predator deterrent programs that may be authorized at Mid-Columbia River hydroelectric facilities owned and operated by public utility districts (PUDs). Bird control programs at the PUD facilities were described and analyzed in the EA *and Finding of No Significant Impact on Piscivorous Bird Damage Management for the Protection of Juvenile Salmonids on the Mid-Columbia River* (Wildlife Services, Olympia, Washington, June 2003). A copy of this document accompanied the permit request.		
Our assessment of impacts to migratory birds for the aforementioned depredation permit request, must consider all proposed take (of MBTA protected birds) throughout the Columbia and Snake River system regardless of facility ownership. From a biological and population management perspective, the total effect of permitting the proposed actions cannot be segregated out by facility ownership. The actions proposed at PUD and Corps hydroelectric facilities are designed to address identical needs, potentially affect the same species and populations of migratory birds, and are geographically linked along the river corridor. Therefore, in consideration of Wildlife Service's permit request to implement the proposed avian control programs at dams throughout the Columbia and Snake Rivers, the Service will evaluate MBTA permitting alternatives and assess the potential impacts of these alternatives on migratory birds. Thorough and appropriate descriptions and analysis of the alternatives proposed in your EA will help to facilitate preparation of the Service's environmental compliance documents for MBTA permit administration.	7.8	Comment noted.
In closing, it is important to recognize that the timing of this EA and Wildlife Service's depredation permit request to implement the proposed action, will	7.9	Comment noted. No lethal take of avian predators will occur as a standard O&M measure

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make it difficult for the Service to complete the environmental compliance documents for any associated permitting actions prior to the start of the smolt out-migration period. The Service is committed to thoroughly examining the full range of MBTA permitting alternatives in a timely manner. We are keenly aware of our roles and responsibilities towards salmon recovery, the conservation of migratory birds, and our obligations under NEPA to provide the public with the opportunity to review and comment on our assessments, procedures, and decisions. Detailed comments are provided.		for APD under the preferred alternative selected in this EA. See response 4.1 regarding the potential for future use of lethal take. Any lethal take considered at Corps' structures will not be implemented until the MBTA take permit, or other appropriate permit (i.e. for research), is issued.
The Environmental Assessment and FONSI rest their proposals on a Biological Opinion issued by the National Marine Fisheries Service on December 21,2000, entitled *Biological Opinion for the Reinitiation of Consultation on Operation of the Federal Columbia River Power System, Including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin.* To quote from Appendix C, Biological Assessment of the EA; operation of the FCRPS that identify actions that, "combined with other ongoing and anticipated measures in the Columbia River basin, are likely to ensure a high likelihood of survival with a moderate-to-high likelihood of recovery for each of the listed species."	8.1	Comment noted.
"The Biological Opinion presented "reasonable and prudent alternatives" (RPA) for the specific RPA dealing with this program is action 101. Through consultation with NMFS, the RPA requires the Corps to implement and maintain an effective means of discouraging avian predation at the Federal Columbia River Power System (FCRPS) dams where avian predator activity is observed." In other words, "the National Marine Fisheries Service made us do it." There is no indication that the Corps of Engineers had any independent opinions as to the advisability, desirability or design of the proposed actions	8.2, 8.3	Comment noted.

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in the consultation process. However, the Corps of Engineers does take responsibility for choosing amongst the alternatives for carrying out the RPA.		
There are two serious problems with the EA: it purports to address the effects of the control alternatives on bird populations, resulting in a Finding of No Significant Impact and, it addresses only the possible effects on bird populations without determining if there are changes in bird populations and if those changes actually improve survival of smolts or improve returns of adult salmon. The presumed purpose of controlling piscivorous birds is to improve populations of salmonids. The cause/ effect connections have not been made. To establish such connections, a testable null hypothesis needs to be proposed, all possible causal factors introduced, boundary conditions and acceptable error limits established, assumptions declared, a data acquisition design prepared, pertinent data obtained and, at minimum correlations produced. A mathematical model, based on a conceptual model, would allow a multivariate analysis to determine which causal factors were operational and to what degree. We call this process "science." None of the elements of this process were carried out. The "finding" is without basis.	8.4, 8.5	We understand what the scientific process is. We are planning to conduct additional research on the affect of APHIS activities on bird feeding behavior.
Some specific problems with your procedures include: Avian-caused mortality downstream from dams was not distinguished from dam-caused mortality.	8.6	Dam-caused mortality to salmonids is beyond the scope of analysis of this EA. The Corps and NMFS are doing research in this area.
There is no statement as to the ability of shooters using lethal control methods to accurately identify the birds killed. Over three thousand "unidentified gulls" were killed, casting doubt on the statistics regarding species actually taken.	8.9	All of the unidentified gulls that were killed were killed at John Day or The Dalles dams in 1997 or 1998. Additional bird identification training has been provided to WS staff since then which has substantially reduced the number of unidentified birds.
There is no information on wounded birds. Were wounded birds counted as	8.10	If a bird appeared to have been hit it was counted

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dead?		as killed.
Table 6-1 does not agree with numbers of birds killed, elsewhere in the EA.	8.11	Table 6.1 is located in the cumulative effects section. The table includes birds that are killed under all permits issued in the State of Washington. The numbers recorded earlier in the report would reflect only those killed at the 8 Corps dams. Therefore, one would expect Table 6.numbers to be higher than presented earlier.
Population trends for targeted birds were not obtained independently, nor ascribed to breeding locations within flying distance of the dams. Birds were not banded to determine if birds belonged to a particular colony within flying distance. The data from the Breeding Bird Atlas are inadequate for statistical analysis in the region, given the few observers and repetitions, over time. Christmas Bird Count data represent a single, one day observation per year with scanty coverage. The number and quality of observers changes from year to year. What is the statistical reliability of these data?	8.12	Data from the Breeding Bird Survey and the National Audubon Society Christmas Bird Count were used primarily as a historic reference. These datasets were not the only source of information used to determine population trends and conclusions on impacts were not reached based on those data alone for any species
Section 2.3, Alternative 3: Exhaust All Non-Lethal Tools First, states that, "Alternative 3 differs from the Current Program in that the Current Program recognizes non-lethal tools as an important dimension of IWDM, gives them first consideration in the formulation of each control strategy, and recommends or uses them when practical and effective before recommending or using lethal tools." It has not been demonstrated that the Current Program has given "non-lethal tools" first consideration. Nor are "practical" or "effective" defined or compared, quantitatively, as to effectiveness to lethal tools.	8.13	The current program was not based on Alternative 3, but Alternative 1 in which lethal methods are sometimes used to remove individual birds in persistent flocks, after trying other non-lethal tools. In all cases, WS tries to non-lethally deter the birds prior to conducting lethal removal. See response to 4.1 regarding evaluation of need for and effectiveness of lethal take.
There is no analysis of the success of non-lethal methods, nor were all non-lethal methods pursued. There are statements regarding "cost effectiveness," efficiency," etc. but no cost benefits or efficiency studies were undertaken. Thus, the entire rationale for using lethal control methods is undercut. Where some non-lethal methods are mentioned, such as wire barriers, we are aware that they are not adequately maintained. There is no real analysis of the	8.14	Non-lethal deterrent methods can be highly effective, but tend to lose their effectiveness over time as birds become accustomed to them. . See response to 4.1 regarding evaluation of effectiveness of non-lethal tools.

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coverage or success of non-lethal methods.		
There is no comparison of avian-caused mortality (which has not been rigorously documented) with other causes of salmonid mortality, including habitat loss, harvest, dam hydraulic loss, and other predation, especially by Northern Pikeminnows. Inasmuch as there is a bounty paid for caught Northern Pikeminnows, their depredations needs to be included in this context.	8.15	Northern pikeminnow predation and other causes of salmonid mortality are beyond the scope of analysis of this EA.
I believe that there is an important legal issue involved in the continuation of this program. The NMFS Biological Opinion issued in 2000, on the Reinitiation of Consultation on Operation of Federal Columbia River Power System was thrown out by a federal judge in 2003. It was found that the document violated the ESA, but was left in place during a one-year remand while the NMFS reconstructs the Opinion. Although the NMFS can follow their opinion while constructing a new one, other agencies relying on it do so at their peril. It would appear prudent to await a new Opinion that passed judicial muster. Otherwise all the actions based on the Opinion in the past may well be considered illegal. Lawsuits would seem inevitable.	8.16	We assume the commenter refers to Judge Redden's ruling, which required NOAA Fisheries to rewrite their Biological Opinion. The Non-Lethal Tools Only is a relatively effective means of discouraging avian predation, and is consistent with the Final Updated Proposed Action (UPA) for the 2004 FCRPS Biological Opinion Remand for routine operation and maintenance of FCRPS fish facilities directed at avian predation abatement.
The computer model, (Kareiva et al., 2000), which is used to justify avian predator control and general salmon policy has major problems. The biggest problem is that the estimate of estuarine survival of smolts is not based on data but assumed, just to make the model work. Then avian predation is introduced to show that by reducing it, survival would increase.	8.17	The computer model refers to NOAA Fisheries' Cumulative Risk Initiative (CRI) model. The model attempts to predict salmon survival throughout its entire lifestage. The model would contain reduction factors for avian predation that occurs throughout the river system, based on the best available scientific information. The model and the estimate of estuarine survival are beyond the scope of analysis of this EA.
Birds that are taken under a USFWS permit are supposed to be provided for scientific analysis for age, sex, genetic makeup, stomach contents, etc. These data are essential to understanding the population dynamics of the various avian species and would assist in analyses of the role of these birds in consuming a variety of fish species. For example, the role of PIT tags in	8.18	Comment noted. Upon request, birds taken at Corps facilities are available for scientific study. The Corps is planning to do research work similar to that done by the Chelan County PUD, working with the University of Washington, which

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modifying behavior of hatchery fish could be better understood. PIT tags may very well bias hatchery fish to be selected preferentially as prey. To not make taken birds available for scientific study is illegal.		examined stomach contents of birds killed on the Mid-Columbia river.
Page. 3.5 states that, "Although no one has defined the exact number of ESA-listed anadromous fish being consumed by avian predators on the Lower Columbia and Snake Rivers, it has been demonstrated that a certain percent are consumed below each hydroelectric dam." The entire attempt to implicate piscivorous birds as major causes of smolt mortality rests on this shaky lack of data.	8.19	We have relied on the best data available to make our decisions. We know that avian predators consume thousands of fish that we are required to try to protect. We are constantly conducting additional research and adjusting the deterrent program to increase the program's effectiveness while limiting overall impacts on the birds.
Under section 4.0 ENVIRONMENTAL EFFECTS, 4.0.1 Method of Analysis, it is stated that, "In the development of this EA, the following issues were identified for evaluation: biological, economic, socio-cultural, and physical impacts. This section analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis. The environmental consequences of each alternative are evaluated to determine if the potential impacts would cause a significant adverse effect. A summary of the alternatives and the environmental affects are compared in Table 4.1." How are these separate effects combined to produce a cumulative effect analysis?	8.20	The separate effects discussed in Chapter 4 were not combined to produce a cumulative impact analysis. Cumulative impact is defined as the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. A cumulative impact analysis is provided in Chapter 6.
Cumulative effects should consider how the Corps' program adds the current program in the Lower Columbia and Lower Snake Rivers to the overall impact on bird populations that are being shot in the mid-Columbia as well. The data are for the entire state, but there is no analysis of the origin of the birds taken. Is it possible that the majority of birds taken of a single species are from one colony?	8.21	The discussion provided in response to comment 4.3 analyzes take data from the dams compared to geographically located colony populations. Ch. 6 of the EA does include birds that are killed by APHIS in the mid-Columbia and elsewhere in the state. The conclusion is that the APD program does not significantly affect bird populations at the local or state level and does not cause a significant effect to the human environment.
The cumulative effect section states that, "Juvenile salmonids commonly experience a number of stressful events or conditions during their seaward	8.22	Many measures are being taken to decrease the impact on salmonids from the dams, however,

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migration. Most of these events occur serially and can have cumulative effects, as when juvenile salmon pass through dams and enter predator-inhabited tailrace areas (Mesa 1994). Because dam passage is a stressful event (Specker and Schreck 1980; Matthews et al. 1986; Made et al. 1988; Abernethy et al. 2001), there is concern that juvenile salmonids passing through dams would not be able to cope with subsequent stressors, such as predators (Mesa 1994)." Does this statement allow you to propose that although dams may be the primary stressor, it is legitimate to emphasize or overemphasize subsequent stressors that result from the primary stressor?		there will always be some level of impact. Since we cannot totally eliminate this impact, we continue to identify measures that could help reduce the overall impact to salmonids and the environment.
This same general mindset is embodied in the statement that, "NMFS (2000b) has identified gulls as significant predators of juvenile salmonids." Gulls are the primary avian predators at Corps hydroelectric dams (Jones et al. 1997, 1998, 1999; NMFS 2000b) and take a minimum of tens of thousands of migrating smolts every year (Jones et al. 1998). The impact of gull predation below a single dam may seem insignificant, but the combined effect of predation on salmon survival at each of the nine Columbia River dams and four Snake River dams is substantial, especially in combination with other negative impacts such as turbines, nitrogen supersaturation, migration delays, and disease." Shouldn't these other factors be evaluated quantitatively to show their relative effects? Gull predation may be substantial, but might not other "negative impacts" be substantial as well?	8.23	Other causes of salmonid mortality are beyond the scope of analysis of this EA.
Table 6.1 Average Take and Range of Piscivorous Species Lethally Removed in Washington State under USFWS Depredation Permit (FY1997-2002) provides average numbers and the range for the period 1997-2002. Exact numbers for each year should be shown for all species as well as the origin of the majority of a single species.	8.24	Numbers for each year, location and species can be requested from APHIS. More detailed take information at other locations would not change bird population estimates. Local bird populations are not being reduced to unacceptable levels, and therefore it is not necessary to identify all locations where birds are being killed.
One cumulative effect that has been completely ignored is the fact that as birds are shot, a vacuum is created that is filled by birds outside the immediate area. Thus heavy control at just one location can have an effect	8.25	While it may occur, no research could be found that depicted the scenario and the commenter did not provide any sources for such information.

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over an area larger than the area from which the birds were drawn initially. If you kill them, they will come, Non-lethal deterrents would not create this effect since no birds are removed.		
In summary, in no way does this Environmental Assessment justify the U.S. Army Corps lethal control program of piscivorous birds. It is based on a legally tenuous Biological Opinion of the NMFS. There is no documentation of the actual effects of piscivorous birds on salmonid mortality in comparison to direct, initial mortality caused by darns, the effects of overharvest, loss of spawning habitat, the effects of piscivorous fish, and improper hatchery management. There is no context setting at all in this document. There is no documentation of actual cost-effectiveness of this program relative to non-lethal means of preventing loss of salmon to birds. Without solid cause & effect information, this program is completely unsupportable.	8.26	Comment noted. We are selecting Alternative 2, Non-Lethal Tools Only, as the preferred alternative under this EA. See also response to 4.1.
Since comparable and cumulative effects needs to be addressed in a rigorous way if this program is to be continued, either a completely rewritten EA, with supporting data, or an EIS needs to be prepared. Since this is a significant Federal Program addressing what the COE alleges to be a major cause of salmonid mortality, an EIS is required.	8.27	An EIS is required when a proposed activity would have a significant effect on the human environment. We believe the potential effects of the APD program do not justify the need for an EIS.
One of the alternative courses of action for the Avian Predation Deterrent Program includes the use of avian poisons. Under this course of action, there is potential for these chemical compounds or their degradation products to be discharged to waters of the state. Any discharge of pollutants to waters of the state is in violation of Chapter 90.58 RCW, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action.	9.1	Comment noted. If we determine that avian poisons should be used, we will coordinate with all of the required permitting agencies.
Similarly, the installation and use of physical avian deterrents must be conducted in such a manner as to avoid discharges of sediment or other pollutants to waters of the state. These discharges would also result in violation of Chapter 90.58 RCW, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of	9.2	Comment noted.

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Washington, and subject to enforcement action.		
We have consistently asked for the immediate cessation of lethal bird control activities on all stretches of the Columbia and Snake Rivers, as we believe there is no scientific grounding to support such take. We do not believe that the US. Army Corps of Engineers (COE), the United States Department of Agriculture/APHIS/Wildlife Services or any other agency has fully complied with NEPA in the initiation of the lethal of birds because they eat juvenile salmonids in the Columbia River system.	10.2	Comment noted. See response to 4.1.
We believe that the U S Army Corps has an obligation under the National Environmental Policy Act ("NEPA), 42 U.S.C. Q4321-4370d, to complete an EIS before it conducts further lethal controls on any fisheating bird species in the Columbia and Snake River systems. We therefore OPPOSE the proposed action of "No Change" in the Preferred Alternative 1: No Action *(*No Change) Current program. Unless and until an EIS is completed, we urge that the Army COE adopt Alternative 2: Non-lethal Tools Only.	10.3 see ALT	Comment noted. An EIS is required when a proposed activity would have a significant effect on the human environment. We believe the potential effects of the APD program do not justify the need for an EIS. We are selecting Alternative 2, Non-Lethal Tools as our preferred alternative under this EA.
On August 7, 2001, the United States District Court for the Western District of Washington entered a summary judgment and injunction order in *National Audubon Society et al v. Butler,* No C00-615R in favor of the four NGO plaintiffs. The Judge acted on the contention that the Army Corps of Engineers practice of using EA's and FONSI'S did not satisfy NEPA requirements. Judge Rothstein also required an EIS before further activities could be conducted by federal defendants to alter Caspian Tern or cormorant habitat in the Columbia estuary, or before any take or harassment of Terns or Cormorants could occur. We settled this case in April 2002, and federal defendants, including the U.S. Army Corps, have agreed to and are completing an EIS. We encourage you to carefully review the Federal Court's ruling before proceeding to kill any more piscivorous birds before conducting an EIS.	10.4	Comment noted. The cited case has been carefully reviewed by the Corps' Office of Counsel. We believe there are significant differences in the two projects. The case cited deals with a habitat modification project, while this project states, on EA page 2-11, any habitat modification projects would require separate NEPA documentation. Also, the ruling on the cited case found there was insufficient evidence to support their claim of no effect. This project has provided analysis on pages 5 & 34 (this comment response package) that supports our claim that there are no significant environmental effects. See also response to 4.1.
Without an adequate understanding of piscivorous bird populations in the region, the full effects on bird populations throughout the region, the	10.5	We believe the potential effects of the APD program do not place an avian species at risk and

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cumulative impacts of Army COE take with other take in the Columbia system, the actual diet composition of the different targeted bird species, the impact of bird predation relative to the 4 H's (Hydro, Habitat, Hatcheries, Harvest) and other causes of salmon mortality, and the status of the fish being preyed upon (percentages by dead, injured, dying or healthy and hatchery vs. wild), the Army COE may be placing avian species at risk through its actions.		does not justify the need for an EIS.
On April 12, 2002, Linda R. Wires and Dr. Francesca J. Cuthbert, Department of Fisheries, Wildlife and Conservation Biology at the University of Minnesota, commented on the WS preparation of an EA for Piscivorous Bird Damage Management for Salmonids in the Mid- Columbia River Basin. They study various colonial waterbird issues in the Great Lakes and across North America, and have published several major publications on fish-eating birds, including the Birds of North America species account, *The Caspian Tern* (Cuthbert and Wires 1999), and *The Status of the Doublecrested Cormorant in North America* (Wires et al. 2001a). They urged WS to cease further lethal control of migratory birds at dams and hatcheries until full NEPA compliance is attained and a comprehensive EIS is completed. We fully support this statement and believe that the Army COE must complete an EIS before lethal take of waterbirds is continued.	10.6	Comment noted.
The entire COE Avian Predation Deterrent Program is based on the NFMS Biological Opinion on the FCRPS, including the 8 COE dams that are the subject of this EA. That BO contains RPA Action 101 that is cited and reprinted at p. 1-1 of the COE EA. RPA Action 101 does not contain any requirement or mention of lethal control of avian predators of listed salmonids. Therefore, the COE is under no obligation to kill birds at its 8 dams….	10.7a	The RPA states that an "effective program" should be implemented. See also response to 4.1.
and no valid research has been completed on the waterbirds' diet and relative impacts to listed salmonid species.	10.7b	The Corps is considering a research proposal to evaluate gull presence and number of fish captured when gulls are, and are not, killed.

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From FY 1997-2002, the COE Program administered by WS-Washington State, shot and killed 10,404 gulls- Ringed-billed, Herring, and California Gulls and unidentified gulls. The COE Program killed 835 Double-crested Cormorants. Also shot and killed were secondary predators including 273 grebes (nearly all Western Grebes), 7 Great Blue Herons, and one common Merganser. One Caspian Tern was killed by WS in 2002 under Army COE contract at a dam by a "misdirected pyrotechnic." See Army COE EA at table 1, Appendix G at page G-8. This killing should cease pending an EIS and science-based studies on these birds, their diets, and analysis of the avian predation in the context of other mortality factors and correlations to adult returns. All lethal take of secondary predators should cease. The Chelan County PUD ceased lethal controls and opted instead to contract with University of Washington scientists to determine if there was any scientific merit in killing these birds. One would think that such studies would be conducted BEFORE lethal controls began.	10.8	Comment noted.
The COE uses a brief and superficial economic analysis to show the value of salmonids at different stages of their life cycle in terms of dollars spent for recovery. We find that scientific evidence is lacking in the EA to support lethal control of birds that predate on fish (including salmonids) that are valued in this document at $6 per fish. Other mortality factors (Four H's), such as dams and sport-fishing that cause mortality to adult salmon are valued at $300, but there is no real analysis of these factors in the context of avian predation. If this economic analysis is accurate and credible, and the goal is to protect endangered salmon runs and the ultimate goal is to increase adult survivorship, then there needs to be a credible, science-based analyses and economic justification for targeting birds.	10.9	Comment noted. The economic valuation was included in the EA to provide an estimate for the intrinsic value of juvenile salmonid.

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Another issue that the EA fails to address is the fact that there are other fish species in the Columbia River system, and some of the birds occurring at the dams may not be eating salmonids or eating very few. There are numerous other species in the system, and in fact the birds may be preying on species such as the Northern Pikeminnow, which actually would have positive effects for listed salmonid stocks. The COE EA and an EIS should analyze and understand the composition of piscivorous bird species' diets before any lethal measures are justifiable. Without this information, the COE may actually be causing more harm to salmon stocks than gain.	10.10	Comment noted. We are aware that the Chelan County PUD is working with the University of Washington to examine stomach contents of birds killed on the Mid-Columbia river. The Corps is considering performing similar research. The commenter did not provide any references or scientific literature to substantiate their assertion.
Another critical factor not adequately addressed is whether the birds are primarily preying upon salmonids that were stunned, injured, or intoxicated from excess nitrogen or the turbines by passing through the dams. The EA acknowledges that this is one of the primary reasons avian predator control is needed at dams. It is absolutely imperative to distinguish between fish that would have not survived and healthy fish to understand the actual effects of bird predation on salmonid mortality. All of these factors could be detected through close monitoring which is a prerequisite for determining the actual environmental impacts. If this level of monitoring is not occurring, then the COE is incapable of making a determination with a simple EA and FONSI. An EIS is required for this program under NEPA.	10.11	We understand what the scientific process is, however, it is extremely difficult to determine, with any degree of confidence, if the fish eaten by a specific bird was previously injured, or whether it would have died later due to other causes. Even with “close monitoring”, as the commenter suggests, it is doubtful that one could prove that a fish eaten was healthy or injured prior to being eaten. An EIS is not required because the APD program does not significantly affect bird populations at the local or state level and does not significantly affect the human environment.

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The entire basis for this and other avian predation control programs in the nation Marine Fisheries Biological Opinion on the Reinitiation of Consultation on Operation if the Federal Columbia River Power system issued in 2000. However, what is not considered or even mentioned in this EA or any other avian predation documents is that this Biological Opinion was thrown out by federal Judge Hogan. While NMFS is required to abide by this decision until a new decision is issued, there is no reason to believe that the COE, Wildlife services or USFWS is obligated to follow and "illegal" BO. Your proposed alternative 1 of No Change in your current block, harass, and kill avian deterrent (program) is not based on science and has a weak legal justification. Under this program, over 11,500 migratory birds have been killed.	10.12	Judge Hogan ruled in Alsea Valley Alliance vs. Evans that set aside the 1998 ESA listing of Oregon Coast coho salmon. We assume the commenter was referring to Judge Redden's ruling where he found the NOAA Fisheries BiOp to be flawed, primarily because it didn't require a sufficient degree of certainty over those actions outside the operation of the dams that are designed to help salmon. The Corps is now selecting Alternative 2 – Non-Lethal Tools only. See also response to 4.1. While it is true that over 11,500 birds have been killed in the last 7 years, in the last 2 years many fewer were killed (694 in 2002 and 677 in 2003). Part of the reason for the reduction is the increased use of non-lethal deterrent methods.
Through out the entire document, there is very little or no information about the primary causes of salmonids mortality, which have been identified as hydropower dams, habitat loss, hatcheries, and harvest. In addition other causes of mortality such as predation by pikeminnows, are not addressed.	10.13a	Identification of primary causes of salmonid mortality and pikeminnow predation is beyond the scope of analysis of this EA.
If the Army COE is to adopt Alternative 1, an EIS is required to establish the scientific merit of continuing the Program with lethal take. The benefits to ESA-listed salmon at the core of the COE Program are speculative at best and a thorough analysis is warranted.	10.13b	We believe the potential effects of the APD program do not place an avian species at risk and does not justify the need for an EIS. The Corps is now selecting Alternative 2 – Non-Lethal Tools only. See also response to 4.1.
As part of any depredation permit, the respective agency is required by law to offer the specimens of taken birds for scientific research. However, we know that thousands of birds are either not collected or are being disposed of before they are made available for scientific purposes. This act is utterly indefensible both legally and ethically. All specimens that are collected should be made available for study of stomach contents, race, sex and age	10.14	Comment noted. Upon request, birds taken at Corps facilities are available for scientific study. We are aware of the research findings by Chelan County PUD, working with the University of Washington, which examined stomach contents of birds killed on the Mid-Columbia river.

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of individuals, DNA analysis, and any other analyses that could help researchers better understand the impacts on bird populations and salmonids.		
Page 6-1 provides very minimal coverage of cumulative effects. Cumulative effects should and do include how the COE Program impacts the environment in addition to other similar programs in the region. However, there is no analysis of how this program in the Lower Columbia and Lower Snake Rivers adds to the impact on waterbird populations that are being shot in the mid-Columbia and elsewhere. Without a thorough look at the cumulative impacts on bird population, the COE 1ethal take component of its avian predation deterrent program should be terminated and Alternative 2 adopted (No Lethal Take). The numbers given are for the entire state, yet there is no analysis of where these individuals taken are originating. For example, it is possible that the great majority of one species taken is coming from one breeding colony. If this is the case, then there may be a significant impact to that one colony. Such analyses have not been done and are not demonstrated. Without such analyses, there is no credible and substantial analysis of the cumulative effects.	10.15	The discussion provided in response to comment 4.3 analyzes take data from the dams compared to geographically located colony populations. Chapter 6 of the EA does include birds that are killed by APHIS in the mid-Columbia and elsewhere in the State. The conclusion is that the APD program does not significantly affect bird populations at the local or state level and does not cause a significant affect to the human environment. The Corps is now selecting Alternative 2 – Non-Lethal Tools only. See also response to 4.1.
On page 6.3, the EA, states, "Crescent Island is Federal property that the COE administers and currently leases to USFWS. Future translocation efforts are a foreseeable action that would involve habitat modification similar to that undertaken at Rice Island." We are quite concerned about this proposal. We strongly advise the COE to fully consider the ramification of such a proposal, and of course such actions would require a full EIS.	10.16	Comment noted.
Appendix B is the current APHIS/Wildlife Services Decision Model Structure. This appendix supposedly details all of the actions undertaken by Wildlife Services as they undergo control measures. However, as we have commented in the past, Wildlife Services is unable to scientifically justify its own procedures and programs. There is no monitoring of bird populations and colonies through the region, no analysis of the cumulative impacts of different programs in the mid-Columbia, the Lower Snake river	10.17	USFWS issues the predation permits and has responsibility of monitoring bird populations and colonies through the region, and assessing its potential impact.

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and the Lower Columbia River, no substantial cost-benefit analysis of lethal means versus non-lethal means, etc. If the COE is basing its program on the Snake and Columbia Rivers on the Wildlife Services decisional model, then perhaps they can identify what the exact impacts are to the populations of every species of piscivorous bird that is being taken. If not, then no such program is justifiable scientifically.		
On page G-1 of the COE EA, the document states, "Precise counts of the bird populations addressed in this EA do not exist." If this is the case, then please explain how the Army Corps can determine there is no significant environmental impact? There is no logic to make this leap, and no credible justification can be given if the COE cannot provide population data for the birds killed.	10.18	The best available data for piscivorous bird populations from the USFWS is provided in this comment response package in Table 2. These population numbers are estimated based on counts of birds or nest at breeding sites. By their nature, bird population counts, unless very small in number, are imprecise.
While we applaud your usage of citizen science projects for this EA, such as the Audubon Christmas Bird Count, we sincerely hope it is not being used to measure populations of migratory birds. Migrants, such as Caspian Terns, are not present during the Christmas Bird Count, so any such data is not applicable to management decisions for migrants. Additionally, the Breeding Bird Atlas - the other document cited for population trends- is not comprehensive for this region and is therefore an inappropriate document to use to scientifically document population trend analyses.	10.19	Data from the Breeding Bird Survey and the National Audubon Society Christmas Bird Count were used primarily as a historic reference. These datasets were not the only source of information used to determine population trends and conclusions on impacts were not reached based on those data alone for any species.
In Appendix F, there is mention of the Composite List of Endangered and Threatened Species. However, there is no mention that White Pelicans are a state-listed endangered species. Is this designation considered in the proposed management actions? If not, it must be considered before a FONSI can be signed.	10.20	American white pelicans are identified as a secondary predator. Given its state listing, lethal control would not be used for white pelicans, as described in Section 2.1 for the No Change alternative. The Corps is now selecting Alternative 2 – Non-Lethal Tools only. See also response to 4.1.
One of the major premises for the justification of killing birds has been the presence of PIT tags and CWTs at colonial bird colonies and in stomach contents. What has not been addressed is the effect of PIT tags upon the behavior of the salmonids with this device implanted in it. One of the primary sources of error in the design of any study is the effect of the	10.21	PIT-tag potential effects on fish survival are beyond the scope of analysis of this EA. We are aware of the research findings by the Chelan County PUD, working with the University of Washington, which examined stomach contents of birds killed on the Mid-Columbia

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treatment on the organism. There are no references presented in the literature about the effects of PIT tag placement in fish upon their behavior and buoyancy. Any small changes in escape behavior, even variability in effectiveness of the placement of tags in the fish, could result in increased susceptibility to avian (or fish) predation. While there is no doubt that cormorants and terns are effective pursuit piscivores, their preference for the slowest or most visible prey may considerably bias the estimations being used to calculate the total number if salmonids being consumed. There are also other factors related to the survival of PIT tagged fish through dams that may increase the potential for predation by less efficient predators such as gulls. The agencies have lost the opportunity to determine such effects by not using the stomach contents of the thousands of gulls and other species collected over the years as their permits stipulate.		river. See also response to 4.1.
We find this Environmental Assessment to be inadequate to continue lethal take of piscivorous waterbirds at the 8 COE dams. We urge the adoption of Alternative 2 Non-lethal Tools Only until an EIS is completed.	10.22	Comment noted. We believe the potential effects of the APD program do not place an avian species at risk and does not justify the need for an EIS. The Corps is now selecting Alternative 2 – Non-Lethal Tools only. See also response to 4.1.
The Corps' EA is inadequate because it fails to be objective, does not include information or reports that differ from the Corps' position, and presents only a very superficial view of the complex issues involved. For example, you fail to mention the report *Review: Bird Predation of Juvenile Salmonids and Management of Birds Near 14 Columbia Basin Dams"* (Yaquina" Studies in Natural History No. 10), which is at http://www.orednet.org/~rbayer/salmon/gullprd.htm; or to objectively deal with the issues about estimating the impact of bird predation that is discussed in the report.	11.3	The cited work is a compilation and narration of research work performed by others. We did review the report and information on the web site. It was not cited in the EA's bibliography because it did not provide new information to reference in the EA.
The Corps' EA shows heavy reliance on: "USDA-APHIS-WS. 2003. *EA and* FONSI *on Piscivorous Bird Damage Management for the Protection of Juvenile Salmonids on the Mid-Columbia River.* Olympia, WA." Unfortunately, their EA is controversial and flawed; for example, see the comments at	11.4	The reason for an EA is to determine whether an EIS is required, or whether a Finding of No Significant Impact is appropriate. We believe the potential effects of the APD program do not place an avian species at risk and does not justify the need for an EIS.

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http://www.orednet.org/~rbayer/salmon/salmon.htm#ws-dams By not adequately and objectively examining all the available information about avian predation at Columbia Basin dams, the Corps' EA fails to satisfy the reason for having an EA.		

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The EIS on Double-crested Cormorant Management in the United States has been finalized (USFWS 2003)	1-7, para 3	Comment noted
It is stated that the timing of control measure to reduce avian predation are dependent on the out-migration of smolts and the number of piscivorous birds congregating at the dams. Control measures should be timed, as stated, to protect out-migration of smolts and thus restricted to the time period April through August. Under what circumstances would there be a need for year-round lethal control at the dams?	2-1, para 2	The 2004 Fish Passage Plan (found at http://www.nwd-wc.usace.army.mil /tmt/documents/fpp/) documents that avian wires are the only avian abatement measures to be used from September through March each year. Hazing as a control measure could be used from April through August, if needed to protect out-migration of smolts.
In the last sentence of this paragraph, and also on Page 2-3, para 5, reference is made to using lethal methods to remove "persistent individuals". It would be more accurate to state that lethal methods are used to remove individual birds in persistent flocks or persistent problem areas.	2-1, para 2	Comment noted
It is stated "The reduction of bird damage may also require that individuals within local populations be reduced through lethal tools." Individual birds cannot be "reduced". Individuals within local populations can be hazed or killed. Lethal control of individual birds is a means to disperse birds/flocks foraging on smolts within the action area and not a means to reduce local populations.	2-1, para 3	The sentence should have said "The reduction of bird damage may also require that individuals, within local populations, be killed by using lethal tools." The Corps is now selecting Alternative 2 – Non-Lethal Tools only. See also response to 4.1.
Lethal tools currently being used include shooting and euthanasia following live capture, however, later on in the document (pg. 2-3) it states	2-2, para 1	The sentence should have said “Lethal tools currently being used is shooting.”

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that shooting is the only lethal measure and in the section discussing tools currently in use (pg. 2-9) shooting is the only tool discussed. Under what circumstances would birds be captured and then euthanized?		
It is stated that piscivorous bird populations and rates of smolt predation are monitored annually. Where are the data on bird populations and if they are available, why are they not used in a quantitative analysis of the magnitude of take (Appendix G)? Are populations monitored at the dams or at colonies or along the river? - define scope of monitoring. Did you intend to say that the number of birds foraging at the dams are monitored?	2-2, para 3	The sentence should have said "In addition, the number of piscivorous birds foraging at the dams are monitored annually."
It is confusing whether lethal control of secondary predators will be conducted in the future. Change sentence two to: Lethal control of the species listed "has occurred infrequently" in the past rather than "has been authorized infrequently". Lethal control of secondary predators has been implemented in the past for western grebes, great-blue herons, and mergansers (pg. 3-7 and 3-8). (The Tables in Appendix G indicate that Forster's terns have also been taken in the past.) The last sentence of this paragraph states that lethal take of other avian species, such as secondary predators would not be allowed for the purpose of juvenile fish protection. However in Appendix G (pg. G-7) it states that the take of secondary predators would be expected to continue.	2-4, para 1	Lethal control of western grebe was used previously when they become trapped inside the dam and were not able to escape. These birds were killed in 2002 and 2003 at McNary Dam. Twelve grebe were captured and released in 2004 at McNary. Standard procedure is to capture and release, which should preclude future lethal take of grebe at McNary. (No Forster's terns have been killed. This error was corrected in the revised Appendix G tables posted during the comment period, and provided at the end of this comment package.)
The use of visual deterrents at hatcheries and reservoirs are discussed but how, specifically, are these employed at the dams (e.g., effigies)? Include a single statement in the first paragraph that details the visual deterrents that are available and which of these are actually employed at the dams.	2-5, para 2	All of the visual deterrents listed in the section are available. Only flagging on bird wires and hydrocannons are currently in use.
Reference is made in the second sentence to using habitat modification to reduce gull populations. Similar references are made on page 2-12, para 3, to reducing gull populations which are causing damage, and on Page 3-5, para 3, to reducing populations of anthropogenic abundant species. We understand that the intent of the Corps APD program is to reduce mortality of listed fish stocks caused by avian species to aid in endangered species	2-11, para 1	Comment noted. The EA states that any habitat modification efforts are outside the scope of this EA (page 2-11 para. 3), and would require separate NEPA documentation.

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recovery. MBTA depredation permits are issued to reduce damages caused by migratory birds while still providing protection for those species. We do not feel it is appropriate to reference predator population reduction as the intention or as a goal of any of these programs.		
Was the project on Upper Nelson Is. documented and if so what is the citation? Please clarify how many birds were nesting on Upper Nelson Island, what species, and when was this work conducted?	2-11, para 1	The citation is Pochop, Cumming, and Engeman. 2001 Field Evaluation of a visual barrier to discourage gull nesting. Pacific Conservation Biology 7:143-145.
Add a citation to the first sentence to document the relocation of the Rice Is. tern colony (e.g., Corps EA 200x that described the tern relocation project). Revise the second sentence to read "The Rice Is. tern colony was successfully relocated to East Sand Is, where the birds now feed...."	2-11, para 2	The NEPA document for the relocation effort is an EA entitled "Caspian Tern Relocation FY 2000 Management Plan and Pile Dike Modification to Discourage Cormorant Use, Lower Columbia River, Oregon and Washington. " The FONSI was signed 17 March 2000. There was also an EA for the pilot study in 1999.
It is stated that the number of Caspian Terns nesting and residing at Crescent Island has increased in the past few years. What is (are) the source(s) of these data? According to Collis et al. (2003) the colony at Crescent Island has ranged in size from 357 pairs to 657 pairs during the period 1997 to 2003. During the past few years (2002 and 2003) the population was <u>below</u> the peak documented in 2001.	2-11, para 3	Comment noted. The sentence should have said "The number of Caspian Terns nesting and residing at Crescent Island has increased above the 1997 population level."
We recommend that the last sentence be deleted and replaced with text similar to that found in Section 2.4 Alternative 4 *i.e.* "the use of non-lethal tools only, may result in increased predator presence and activities in areas near the dams where juvenile salmonids are susceptible. Consequently avian predation on juvenile salmonids would likely increase."	2-12, para 4	Comment noted.
The purpose of this section of the EA is to describe existing conditions. The document currently only describes the current action, not the affected resources. Basic information on the abundance and distribution of potentially affected bird species should be presented. Much of this		Information from the spreadsheets is included in Tables 2 and 5 at the end of this comment table. The Table 2 information for gulls is used for evaluating the magnitude of the environmental

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information is now included in Appendix G, but should be presented here. Note: there are many inaccuracies in the information presented in Appendix G and these should be addressed before being incorporated here (see comments to Appendix G). We have attached a spreadsheet that compiles the existing information on avian breeding populations in the project area. We recommend that this information be used to describe the Existing Environment and as the basis for evaluating the magnitude of the Environmental Effects.		affect in a prior comment. The double-crested cormorant colony survey data in Table 5 shows an increasing estimated number of breeding birds for the Columbia River estuary islands and Potholes Reservoir. The closest dam to the estuary islands is Bonneville Dam, where in 2000 and 2001, 45 and 29 double-crested cormorants were killed. In the same timeframe, the estimated number of breeding birds increased from 13,000 to 17,000 in 2002. The summary table for Coastal Washington (from Naughton et.al.) also shows that the number of nests on Inland Waters have increased from 550 in 1978-81 to 874 in 2002-03. The number of double-crested cormorant at Foundation Island is estimated to be a constant 400, from 2000 to 2002, based on a quick visual estimate by David Craig. Ice Harbor and McNary Dams are the dams nearest to Foundation Island. A total of 168 birds have been killed from 1997 to 2002 at Ice Harbor and McNary Dams. In both locations, the potential negative affect on gull colonies near Bonneville and The Dalles dams is not considered to be a significant environmental affect. Future predation permits issued by USFWS are expected to set take limits at each dam facility, to ensure the APD program does not pose a significant environmental affect.
While most visitors to the dams are interested in viewing salmon and steelhead, birdwatching is a recreational opportunity that is enjoyed by	3-1, para 2	Comment noted. Birdwatching was not intended to be excluded as a recreational activity. Recreational

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many visitors. Opportunities for birdwatching are reduced as a result of the avian control programs reduces.		impacts are discussed in Section 4.1.5 on page 4-14. Hazing and dispersing the birds, congregated at the dams, moves them into other more natural settings for alternative recreational viewing.
The sources cited (Jones et al. 1996, 1997, 1998, 1999; and Collis et al. 2001) evaluated the effects of control programs but did not study or quantify the loss of smolts to avian predation through the hydrosystem.	3-3, para 3	Comment noted.
It is true that the relative effect of different vertebrate predators is rarely quantified but vertebrate predators should not be limited to birds and mammals, e.g., fish are very significant predators of salmon smolts.	3-3, para 4	Comment noted. Northern Pikeminnow predation and other causes of salmonid mortality is beyond the scope of analysis of this EA.
The effect of gull predation on salmon survival may be substantial when combined with other factors such as turbines, nitrogen supersaturation, migration delays and disease. However, it is highly unlikely that the effects of gull predation are completely additive (as opposed to compensatory) mortality. The significance of gull predation to salmon recovery is not fully understood.	3-3, para 5	Comment noted. See also response to 4.1.
It is stated that the smolt migration begins in early April. According to RPA Action Item 1.1 "Controls shall remain in effect April through August...." In Section 2.1, the No Action Alternative states "control generally begins in March and ends in July". The tables in Appendix G indicate that lethal take occurs year-round. For example, 54% of the double-crested cormorants are taken outside the peak out-migration period of late March through August. Is the take of birds during this fall and winter period really directed at the protection of out-migrating smolts? We recommend that the period for implementing the control program be clarified and tied to the period of peak salmon out-migration. This period should then be consistently referenced throughout the document	3-5, para 2	Appendix G Table 10 includes data back to 1997. The haze and kill timeframe has been compressed over the years, and was limited to March thru August in 2003. See also response to 4.1.
The purpose of this paragraph is unclear, and we don't understand the relationship of the information presented in this section to the issue at hand.	3-5, para 3	The paragraph attempts to describe the unnatural condition and population of birds that has been created by man at the dams.

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The number of birds (all species) reported as hazed and killed in this section does not agree with the number of birds reported in Table 1, Appendix G. Specifically: **RBGU -** on pg. 3-6, lethal take between 1997 - 2001 = 4,947 birds (average/year = 898) versus 4,687 (average/year = 939) in App. G; CAGU - on pg. 3-6, lethal take between 1997 - 2001 = 1,622 birds (average/year = 324) versus 1,628 (average/year = 326) in App. G. **HEGU -** on pg. 3-6, lethal take between 1997 - 2001 = 161 birds (average/year = 32) versus 153 (average/year = 31) in App. G. **Unidentified Gulls -** on pg. 3-6, lethal take between 1997 - 1998 = 3,275 birds versus 3,264 in App. G. DCCO - on pg. 3-6, lethal take between 1997 - 2001 = 890 birds (average/year = 178) versus 829 (average/year = 166) in App. G.	3-6 to 3-8	The discrepancy appears to be the difference between calendar year reporting (January through Decemeber) and fiscal year reporting (October through September). The differences are not significant and do not change the determination that there is not a significant environmental affect.
What is the citation for the statement "The increase in take [California gulls] in FY2001 is most likely attributed to increased colony populations and increased usage of the tailrace areas." We can find no numbers that indicate that California gull colonies were larger in 2001 than the 2-3 years previous or subsequent. Earlier discussions with Wildlife Services had indicated that increased take during 2001 was due to low water flows that resulted in changes in bird and/or smolt behavior.	3-6, para 1	The sentence should have said " The increase in take is most likely attributed to increased usage of the tailrace areas." Due to an apparent decrease in the California and Ringed-billed gull breeding bird population (see Table 2), the magnitude evaluation factor in Table 4.3 should have been HIGH. This would have changed the overall impact rating to MODERATE. Since the overall impact rating is not HIGH, the program does not have a significant impact on California gulls.
The citation date for the Final Double-crested Cormorant EIS is 2003 not 2001; 68 FR 47603.	3-7, para 3	Comment noted.
Western Grebes are secondary predators; although they have been taken in the past, it was stated that these species would not be lethally taken in the future.	3-7, para 4	See response to 7.4.
Add Forster's Tern to the list of other avian predators that have been lethally taken in the past (see Table 1, Appendix G).	3-8, para 2	This was an error in Table 1, Appendix G.

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As with Section 3, much of the discussion regarding Environmental Effects is contained in Appendix G, and should be presented within this section. The analyses presented in this section are incomprehensible.	Chap. 4	Comment noted.
Table 4.2 is unintelligible.	4-2	Table 4.2 identifies the criteria for a significant adverse biological impact. There are two sets of conditions when the impact rating would be considered significant. First is when the impact has a high magnitude and high likelihood, a moderate or high geographic extent. The second is when the impact has a high magnitude and high duration and frequency, a moderate or high geographic extent, and moderate likelihood. Unless all of the biological impact evaluation factors meet or exceed these criteria, the environmental impact is not considered significant.
Magnitude is defined as a measure of the number of animals killed in relation to their abundance. We concur with this definition and recommend this section be substantially revised to address this evaluation factor. Currently, the analysis attempts to derive a measure of magnitude from population trends and the relationship of the proposed take to a hypothetical total depredation permit take. We do not understand this logic. Information presented in this section bears no relationship to magnitude as defined above. We disagree that quantitative data is unavailable for the purposes of this analysis and recommend that a quantitative, rather than a qualitative, approach be taken. This would include using the best available estimates of population size and proposed take of affected avian species to clearly present and articulate the effects of the proposed action. Some of this information is presented in Appendix G (as revised per our comments on that section) and should be used to assess the magnitude of take as defined above. Although continental, regional, and statewide population estimates may be imperfect, they represent the best available information	4-3	Comment noted. Figure 4.1 depicts the process flowchart for the magnitude evaluation factor is first based on depredation permit take level. Since depredation permit take levels are not yet established for the Corps dams, the magnitude evaluation factor is based on population trend, which is a quantitative approach, and uses the best available population information on which to base the analysis of impacts.

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on which to base the analysis of impacts. Additionally, data on colony distribution and size in the Columbia River and immediate project area is also available to further refine this analysis. We have compiled the existing information on breeding populations in Washington and along the Columbia River corridor of Oregon and provided this in a spreadsheet.		
Regarding the Geographic Extent evaluation factor, the analysis area should be related to both the proposed actions and the resources potentially affected. We recommend that Washington state and the entire Columbia River corridor in Washington and Oregon be used as the baseline for analyzing how wide-spread the impact might be. Restricting the analysis of impacts to bird populations to limited sections of the Columbia River fails to address the appropriate scale. Again, we recommend that the entire state of Washington and the Columbia River corridor in Oregon be used as the geographic baseline, and that colony distribution in the immediate project area (Columbia River) also be considered in this section.	4-4	The magnitude evaluation factor, by using population data from nearby geographic areas addresses how widespread the impact might be. The geographic extent (section 4.0.1.2 page 4-4) should have been defined as "how widespread the program might be". In other words, do the birds have other geographic areas (safe havens) where the program is not administered? If the program is only administered in a small geographic area, then the geographic program effect factor is defined as low.
The duration and frequency of the proposed action needs to be clarified.	4-6	The duration and frequency for each species listed in Table 4.3 is HIGH, which indicates birds were taken over a number of years and are expected to be taken on a seasonal basis every year. The duration and frequency factor for secondary predators in Table 4.3 should have been LOW, as these species are not expected to be killed in the future The Corps is now selecting Alternative 2 – Non-Lethal Tools only. See also response to 4.1.
This sections states "The Corps provided its Biological Assessment to USFWS and NMFS, which identified the program's expected effect on ESA-listed species." The benefits to smolt survival need to be further described here.	4-7, sect. 4.1.2	The determination of the biological assessment (see appendix C of the EA) is that the program "may affect, not likely to adversely affect (beneficial effect)" for endangered anadromous and steelhead species.

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Per our previous comments, the impact analysis should directly address the number of birds killed in relation to their abundance on a species-by--species basis for Primary Predators. References to percentages of a "total depredation permit take" should be deleted. We do not understand what this factor is, or how it relates in any way to assessing the magnitude of take. We do not recommend the use of BBS trend data for assessing pages impacts to colonial nesting birds. BBS does not adequately monitor population trends of these species.	4-8 thru 4-17	The only time population trend is not factored into the magnitude evaluation factor is when the APHIS-WS kill is less than or equal to 33% of the total depredation permit take. If USFWS were concerned about a situation where both the population trend was decreasing, and APHIS-WS kill is less than or equal to 33% of the total depredation permit take, that USFWS would reduce the take amount so that a future take of 1/3 would be expected to result in a stabilized or increased population the next year. BBS and CBC data presented in Appendix G is primarily used as a historical reference and conclusions on impacts were not reached based on BBS data alone for any species.
Information and analysis presented in Appendix G is critical to the analysis of impacts and should be more appropriately incorporated into this section.	Chap. 4	Comment noted. Additional population data was provided during the comment period, which has been evaluated and incorporated into the impact analysis in this comment response table.
We do not understand the first sentence: "Under the current program, the Corps, with the assistance of APHIS-WS, addresses damage to piscivorous birds associated with the dams". Do you mean damage from piscivorous birds?	6-1, para 2	Yes.
The data presented in Table 6.1 is not valid. This table should be deleted, along with the reference cited in Appendix H. We do not have any "unpublished report" to match this citation. We can provide data for actual take, which occurred under Depredation (damage control) and Scientific Collecting (research) permits in WA, for the listed species, during 2001-2002 to serve the purpose of assessing the proposed action from a cumulative take perspective.	6-1	Table 6.1 is a summary of the birds killed, as documented in Appendix G Table 1. The unpublished report is a collection of 3 separate documents from USFWS. These include take under research permits MB827457-1 (D. Roby) and

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		MB000083-7 (K. Collis), a summary of research take for 1997 to 2000, a summary of take for 2000 and 2001 (excluding WA USDA take; see Table 3 below) and a Depredation Tracking Report for 2000 and 2001 by species for WA, OR, & CA. This data was used to help assess cumulative impacts in the region. The data can be provided, if requested.
We recommend deleting the statement "The USFWS Caspian Tern Site Feasibility Assessment (Seto, et al. 2003) reported there was no management potential on the Mid-Columbia River islands because it would not reduce Columbia River impacts." This statement is not relevant to the discussion taking place in this section.	6-3, para 1	Comment noted.
The last sentence states "As a result of the relocated tern colony in the Columbia estuary, juvenile salmon take in 2002 was reduced 67 percent from an estimated 18 million to 6 million." What is the source of these numbers? The web site referenced immediately after this statement does not support with these estimates. Data compiled from Dr. Roby's reports on the colony relocation study indicate that the best estimate of peak salmonid consumption in this study area was 13.8 million in 1999 when there were active Caspian Tern colonies on both East Sand and Rice islands. In 2001, when terns only nested on East Sand Island, the estimated smolt consumption was 5.8 million. In 2002 it was 6.5 million.	6-3, para 1	Comment noted.
We do not understand how this relates to the proposed action since this avicide was earlier classified as a lethal tool that was not used.	6-3, para 2	The avicide has not been used in the past, but is a reasonable foreseeable avicide that could be used in the program, in the future, if deemed necessary and effective. The Corps is now selecting Alternative 2 – Non-Lethal Tools only. See also response to 4.1.
We recommend that this section be deleted relocation of the Caspian Tern colony at Crescent Is. has not been proposed and is not part of the action described in this EA.	6-3, para 4	Comment noted.

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We don't understand why there is a separate Appendix G containing population data for potentially affected avian species. This Appendix is only referenced twice in the main text of this EA, in the Environmental Effects section. Much of the data presented here is very relevant to Sections 3.0 Existing Environment and 4.0 Environmental Effects and should be incorporated into those sections, rather than presented separately in an Appendix that is infrequently referenced.		Comment noted. Appendix G is a part of the EA.
Data presented in this table does not correspond with any of the published or unpublished data on colony size that we could find (see attached spreadsheet). If this Table is retained then the input should be corrected and citations for original data sources should be included. We have provided three examples of inconsistencies between the estimates in Table A of the EA and estimates in the literature (see Table 4 at the end of the comments table).	G-1, Table A	Table A of App. G was mistakenly presented as specific colony population data based on a draft report. This data is actually the number of Passive Integrated Transponder (PIT) tag codes recovered in each of the locations. The number of PIT tag codes recovered at the tern colony on Crescent Island was 11,155, not the tabled 1,160 and the number recovered from East Sand Island was 23,062, not 19,866 as reported. Tables 2 and 5 of this comment response package contains the estimated gull and cormorant breeding populations for locations within the Lower Columbia and Snake River region.
Breeding Bird Survey: The statement "this survey has not characteristically been the best population monitoring tool for colonial nesting species such as gulls, terns, and cormorants" is repeated twice in this paragraph. We concur that this survey is not a good tool for monitoring trends of colonial nesting species. The sentence attributed to Sauer et al. 2001 is incomplete.	G-2, para 2	Comment noted.
Christmas Bird Count: A long term data set exists for Oregon and Washington, however, the number and location of count circles and the number of observers participating in the counts has varied over time and deriving population trend information from this data source is not straightforward. See Sauer, J.R., and W.A. Link. 2002. Using Christmas	G-2, para 3	Comment noted.

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Bird Count data in analysis of population change. Am. Birds 56:10-14.		
Published Literature: This is the best source for population and trend information for the species concerned. In addition, considerable research has been conducted over the past ten years, especially in Washington and Oregon along the Columbia River (some of this work has been funded by the Corps) and unpublished information from this work is available upon request from the researchers and should be incorporated into this analysis. We acknowledge that these data are not without flaws and some assumptions and adjustments must be made to derive population estimates and trends. However, they represent the best available information for these species, especially within the project area, and it would be illogical to overlook them in favor of the very convoluted "qualitative" approach, that is based to a larger degree on assumptions and adjustments.	G-2, para 4	Comment noted.
It is true that populations of colonial waterbird species have increased over the past 60 years. However, it is important to note that many of these populations were at extremely low levels due to a variety of causes such as contaminants and human persecution. E.g., Ring-billed Gulls were nearly decimated by human persecution and development from 1850 to 1920, but have since rebounded (Ryder 1993); likewise, Double-crested Cormorant populations in the Pacific states were severely reduced due to human activities in the 19^{th} and early 20^{th} century and then again by the effects of contaminants such as DDT until its ban in the 1970s (Hatch and Weseloh 1999, Carter et al. 1995)	G-3, para 1	Comment noted.
Christmas Bird Count: see notes above regarding the use and interpretation of these data. Comparisons of absolute numbers of birds counted in 1901 and the present is not an accurate reflection of trends.	G-3, para 5	Comment noted.
Published Literature: This section contains numerous errors and misrepresentations of the literature. We have listed some of the more	G-4	Comment noted. Data is provided in Table 2 and 5 at the end of this comment table. The data provided

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significant examples here, but suggest that the section be thoroughly vetted and revised. Data provided in the attached spreadsheet that summarizes colony surveys in the project area of Washington and the Columbia River corridor of Oregon should be incorporated into this section.		has been incorporated into the analysis in the comment response section of the EA.
The breeding population of California Gulls in Washington state is incorrectly reported as "138,000 pairs in 1980 (Conover 1983)". This estimate is the cumulative estimate Conover et al. (1983) presented for the breeding population in all of the western states (10 states combined). Estimates of the Washington population presented in this publication were based on surveys conducted in 1977 and reported in Conover et al. (1979): 9,052 breeding California Gulls (4,526 pairs). [Note: Conover et al. (1979) was cited as the original source for Washington colony information reported in the subsequent publication: Conover (1983). However, there are discrepancies between some of the colony estimates presented in the two publications. In a personal communication with Conover (March 2004) he stated that the 1979 publication was the original source and estimates from this publication should be used rather than those in the 1983 publication.]	G-4, para 2	Comment noted.
The distribution refers to the breeding range and this should be clarified.	G-4, para 2	Comment noted.
Survival estimates from Winkler (1996) are inaccurately reported. Adult survival decreased with age and ranged from approximately 92% for 4-yr-olds to about 75% for 20-yr-olds. Survival rates for immatures are poorly understood but are probably in the range of 55-90% (Winkler 1996).	G-4, para 2	Comment noted.
It is assumed that this paragraph is about Ring-billed Gulls although this is never stated. The estimate of the current Washington breeding population (390,000 breeding individuals) reported here is derived from an inaccurate 1980 population estimate and a population growth rate (6.4%) of unknown origin. Conover (1983) estimated a breeding population of approximately 106,000 Ring-billed Gulls in the entire western U.S., not the state of Washington as reported in the EA. His estimate for the state of Washington	G-4, para 3	Comment noted.

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and the Columbia River colonies in Oregon was 17,468 birds (8,734 pairs) in 1977 (Conover et al. 1979). [see the Note above regarding population estimates by Conover et al. 1979 and Conover 1983.]		
The distribution information is a mixture of breeding and non-breeding season distributions without notation.	G-4, para 3	Comment noted.
Has the identification of the gull species in the project area been verified? Glaucous-winged x Western Gull hybrids are not discussed in this section, even though there is a large colony of these gulls in the Columbia River estuary and a small colony at Miller Rocks. Herring Gulls do not breed in Oregon or Washington. Non-breeding Herring Gulls do occur in the state and along the Columbia River corridor but it would seem likely that Glaucous-winged x Western Gull hybrids would be numerically dominant during the late spring and summer.	G-4, para 4	Glaucous-winged gulls are known to hybridize with western gulls in Oregon and Washington and the resulting hybrids are often difficult to identify. APHIS-WS has not reported any hazing or taking of Glaucous-winged x Western Gull hybrids. The commenter did not provide any population data for Glaucous-winged x Western Gull hybrids in the Columbia River estuary or Miller Rocks.
The first half of this paragraph deals with distribution and migration and is very confusing. Identify whether it is breeding or non-breeding distribution that is being discussed.	G-4, para 4	Comment noted.
What is the source of the 1982 estimates of 6,000 California and 5,600 Ring-billed Gulls near Richland, WA?	G-5, bullet 1	The citation is Weber and Fitzner. 1986. Nesting of the Glausous-winged gull East of the Washington Cascades. American Birds 40:567-569.
Roby et al. (1998) counted approximately 34,900 gulls on the colonies near Richland in 1996 and noted that doubling these counts would provide a reasonable estimate of the total number of breeding birds. This calculation coincides with the estimate of 70,000 breeding birds reported in the first bullet. In more recent discussions with Dr. Roby (March 2004) he suggested that adjusting the numbers by a factor of 1.4 would provide a reasonable estimate of the number of breeding birds (adjust by 0.7 to estimate the number of pairs). This produces an estimate of approximately 48,850 breeding birds. The spreadsheet we have provided includes both the actual number of birds counted, the correction factor used to adjust this count to estimate the total number of breeding birds, and the estimate of	G-5, bullet 1	Comment noted.

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breeding birds. Regardless of the adjustment value used, there has been an increase in the number of birds in the Richland area from approximately 3,600 breeding birds in 1977 (Conover et al. 1979) to approximately 48,850 in 1996 (Roby et al. 1999).		
This bullet is accurate but it is unclear what is the intent of presenting this information. Without more detail on the location of these specific islands or estimates for the rest of the 17 islands these data are of limited value. Upon request, APHIS-WS provided the unpublished data for the entire survey and this is provided in the attached spreadsheet. (see Table 2 summary at the end of the comments table)	G-5, bullet 2	The citation is York et. al. 2000, which is included the spreadsheet that was attached, and in the Table 2 summary.
It is true that the gull colonies on Cabin Island supported >7,000 breeding Ring-billed and California Gulls in 1996. However, it should be noted that the most recent surveys of Cabin Island indicate that the gull colonies have been extirpated at this site. No gulls have nested here since 2000.	G-5, bullet 3	Comment noted.
Recommend that the proposed take be evaluated against the current estimates of the breeding population. The conclusion that "The No Action alternative is not likely, nor designed, to impact gull populations on a Statewide basis." is not supportable based on the information provided.	G-5, para 5	Additional analysis is provided earlier in this comment response table. The Corps is now selecting Alternative 2 – Non-Lethal Tools only. See also response to 4.1.
See earlier comments regarding the use of BBS data to document trends for colonial species.	G-6, para 1	Comment noted.
See earlier comments regarding the use of CBC data to document trends, especially the use of absolute count data.	G-6, para 2	Comment noted.
Note that the subspecies of Double-crested Cormorant nesting in Washington is the western subspecies *Phalacrocorax auritus albociliatus* and is distinct from the more abundant and rapidly increasing subspecies of the interior and eastern US.	G-6, para 3	Comment noted.
Double-crested Cormorant populations are increasing in the project area.	G-6, para 3	The information is provided in Table 5 at the end of this comment table. The data shows that Double-

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		crested Cormorant breeding bird populations are increasing at Potholes Reservoir and the Columbia River estuary islands, and are estimated as holding constant on Foundation Island.
Population data are available but not presented in this account. These data should be evaluated before it is determined that the proposed action is not likely to impact Double-crested Cormorant populations.	G-6, para 5	Additional analysis is provided earlier in this comment response table that concludes the proposed action is not likely to significantly impact Double-crested Cormorant populations. The Corps is now selecting Alternative 2 – Non-Lethal Tools only. See also response to 4.1.
The issue of lethal control of secondary avian predators is inconsistently dealt with throughout this document. Early on it is stated that lethal control of secondary predators will not occur in the future, however, in this paragraph it states that lethal control of these species is expected to continue.	G-7, para 2	See response to 7.4.

Table 2
Historical Summary of the Estimated Number of Breeding Birds for Gulls

Year	Memaloose, Miller Rock & 3 Mile Canyon Islands	Crescent Island	Richland & Island 18
1977	10,636	ND	3,602
1996	15,357	4,668	48,845
1997	25,238	8,077	46,641
1998	19,093	6,436	49,024
1999	ND	6,901	ND
2000	16,202	5,967	43,400
2001	15,170	3,766	43,400
2002	11,480	ND	43,400

Data source: Furnished by USFWS comment submittal package dated 4/5/2004.
Data for California and Ring-billed Gulls are combined. In most cases, individual population data is not known.
ND – No data

Table 3

Birds reported taken under the authority of Depredation and Scientific Collecting Permits in WA, 2001-02

Species	2001	2002	Average
California gull	3460	2305	2882.5
Ring-billed gull	5615	5873	5744.0
Herring gull	556	477	516.5
Double-crested cormorant	407	1043	725.0
Caspian tern	1069	321	695.0
Great blue heron	168	75	121.5
Common Merganser	75	84	79.5

Data source: Furnished by USFWS comment submittal package dated 4/5/2004.

Table 4
Examples of inconsistencies between the estimates in Table A of the EA and estimates in the literature

Location/ *Species*	**Table A Estimates**	**Estimates in Literature**	**Source**
Three Mile Canyon Island *Gulls*	792	8,836	Antolis 2003
Island 18 *Gulls*	529	12,669	Roby et al. 2001
Foundation Island *Cormorants*	3,541	<200	Roby et al. 2001

Data source: Furnished by USFWS comment submittal package dated 4/5/2004.

Table 5

Summary of Double-crested Cormorant Colony Surveys in Washington and Columbia River Colonies in Oregon

STATE	SITE NAME	YEAR	SPECIES	# BIRDS	# NESTS	Est. # Breeding Birds	WHATCOUNT*	CONVERSION	NOTES	SOURCE
COASTAL COLONIES										
OR	Columbia R. Estuary	1980	DCCO		131	262			Trestle Bay	OR Colony Catalog
OR	Columbia R. Estuary Islands	1989	DCCO		91	182	N	2	Doug Bell; East Sand Is.	OR Colony Catalog
OR	Columbia R. Estuary Islands	1997	DCCO		5,541	11,082				Dan Roby, pers. comm. Feb 2004
OR	Columbia R. Estuary Islands	1998	DCCO		6,336	12,673				Dan Roby, pers. comm. Feb 2004
OR	Columbia R. Estuary Islands	1999	DCCO		6,002	12,004				Dan Roby, pers. comm. Feb 2004
OR	Columbia R. Estuary Islands	2000	DCCO		6,567	13,135				Dan Roby, pers. comm. Feb 2004
OR	Columbia R. Estuary Islands	2001	DCCO		7,622	15,244				Dan Roby, pers. comm. Feb 2004
OR	Columbia R. Estuary Islands	2002	DCCO		8,734	17,467				Dan Roby, pers. comm. Feb 2004
OR	Columbia R. Estuary Islands	2003	DCCO		10,857	21,714				Dan Roby, pers. comm. Feb 2004
INLAND COLONIES										
WA	Foundation I	1998	DCCO		100	200	P	2	In rpt text (p17) has <100 pairs on Is near mouth of Snake R; no specific info on year	Roby etal. 2001 Trans. Am Fish
WA	Foundation I	2000	DCCO	400			B		v. quick visual estimate by Craig	Brad Ryan NOAA [David Craig]
WA	Foundation I	2001	DCCO	400			B		v. quick visual estimate by Craig	Brad Ryan NOAA [David Craig]
WA	Foundation I	2002	DCCO	400			B		v. quick visual estimate by Craig	Brad Ryan NOAA [David Craig]
WA	Potholes Res	1978	DCCO		8	16	N	2		Finger and Tabor 1997
WA	Potholes Res	1982	DCCO		30	60	N	2		Finger and Tabor 1997
WA	Potholes Res	1989	DCCO		99	198	N	2		Finger and Tabor 1997
WA	Potholes Res	1991	DCCO		425	850	N	2		Finger and Tabor 1997
WA	Potholes Res	1997	DCCO		652	1,304	N	2		Finger and Tabor 1997
WA	Okanagan River mouth	2003	DCCO		8	16	N	2	near Wells Dam	Michael Schroeder, WDFW pers comm. 3/10/04 email

***SUMMARY TABLE FOR COASTAL WASHINGTON** (**from Naughton et al., 2004**)*

Double-crested Cormorants - WASHINGTON

Active Nests	1978-81[1]	1992[2]	2002-03[3]
Inland Waters	550	553	874
Outer Coast	625	571	204
South Coast Estuaries	450	494	88
WASHINGTON- TOTAL	**1,625**	**1,618**	**1,166**

Data Sources:

[1]Speich and Wahl 1989

[2]Carter et al., 1995 (inland waters); U.Wilson pers. comm.

1990-92 Estimate for the inland waters is incomplete inventory; NWR islands only

[3]D.Nysewander, WDFW unpubl. data; U.Wilson, USFWS unpubl. data.

Table 6

ummary of California and Ring-billed Gull Colony Surveys in Washington and Columbia River Colonies in Oregon

lumbia River Estuary

STATE	SITE NAME	YEAR	SPECIES	# BIRDS	# NESTS	Est. # Breeding Birds	WHATCOUNT*	CONVERSION	NOTES	NOTES	SOURCE
OR	East Sand Island	1977	RGBU	0							Conover etal. 1979
OR	East Sand Island	2000	RBGU		120	240	N	2			OR Colony Catalog
OR	East Sand Island	2001	RBGU		200	400	N	2			OR Colony Catalog
OR	Miller Sands spit	1998	RBGU		100	200	P	2	In rpt (p17) has < 100 prs; no specific info on year		Collis etal. 2002 Trans. Am Fish

Estimated # of Breeding Birds

Year	Estuary
1998	200
2000	240
2001	400

CAGU = California Gull
GWWG = Glaucous-winged x Western Gull Hybrid
RGBU = Ring-billed Gull

What Counted: N = nests B = birds
Birds on the colony is an underestimate of the total # of breeding birds

File: WA gull & corm estimates.xls, sheet CAGU & RGBU

Summary of California and Ring-billed Gull Colony Surveys in Washington and Columbia River Colonies in Oregon

STATE	SITE NAME	YEAR	SPECIES	# BIRDS	# NESTS	Est. # Breeding Birds	WHATCOUNT*	CONVERSION	NOTES	NOTES	SOURCE
WA	Little Memaloose	1977	CAGU		428	856	N	2	direct count		Conover etal. 1979
WA	Little Memaloose	1996	CAGU	542		759	B	1.4		Table 2	Roby etal. 1999; 1998 Ann Rept
WA	Little Memaloose	1997	CAGU	939		1,315	B	1.4	+73%inc from 1996, Roby etal. 1999		Collis etal. 2002 Trans. Am Fish
WA	Little Memaloose	1998	CAGU	357		500	B	1.4	-62%dec from 1997, Roby etal. 1998		Collis etal. 2002 Trans. Am Fish
WA	Little Memaloose	2000	CAGU	300		420	B	1.4	CAGU; no RBGU Roby pers.com.	quick visual estimates by D. Craig	Brad Ryan, NOAA, pers comm
WA	Little Memaloose	2001	CAGU	300		420	B	1.4	CAGU; no RBGU Roby pers.com.	quick visual estimates by D. Craig	Brad Ryan, NOAA, pers comm
WA	Little Memaloose	2002	GULL	0		0	B	1.4		quick visual estimates by D. Craig	Brad Ryan, NOAA, pers comm
WA	Little Memaloose	2003	GULL	0		0	B	1.4			Dan Roby pers. comm. 3/24/04
WA	Miller Rks	1977	RBGU		480	960	N	2		direct count; in Conover 1983 #s for RBGU & CAGU were reversed	Conover etal. 1979
WA	Miller Rks	1977	CAGU		30	60	N	2		direct count; in Conover 1983 #s for RBGU & CAGU were reversed	Conover etal. 1979
WA	Miller Rks	1996	CAGU/RBGU	1,599		2,239	B	1.4			Roby etal. 1999; 1998 Ann Rept
WA	Miller Rks	1997	CAGU/RBGU	3,783		5,296	B	1.4	+128%inc from 1996, Roby etal.		Collis etal. 2002 Trans. Am Fish
WA	Miller Rks	1998	CAGU/RBGU	2,179		3,051	B	1.4	-42%dec from 1997, Roby etal.		Collis etal. 2002 Trans. Am Fish
WA	Miller Rks	2000	CAGU/RBGU	1,700		2,380	B	1.4		quick visual estimates by D. Craig	Brad Ryan, NOAA, pers comm
WA	Miller Rks	2001	CAGU/RBGU	1,700		2,380	B	1.4		quick visual estimates by D. Craig	Brad Ryan, NOAA, pers comm
WA	Miller Rks	2002	CAGU/RBGU	1,700		2,380	B	1.4		quick visual estimates by D. Craig	Brad Ryan, NOAA, pers comm
OR	3 Mile Canyon I	1977	CAGU		2,190	4,380	N	2	Strip transects to count nests		Conover etal. 1979
OR	3 Mile Canyon I	1977	RBGU		2,190	4,380	N	2	Strip transects to count nests		Conover etal. 1979
OR	3 Mile Canyon I	1996	CAGU/RBGU	8,828		12,359	B	1.4			Roby etal. 1999; 1998 Ann Rept
OR	3 Mile Canyon I	1997	CAGU/RBGU	13,305		18,627	B	1.4	+51%inc from 1996, Roby etal. 1998		Collis etal. 2002 Trans. Am Fish
OR	3 Mile Canyon I	1998	CAGU/RBGU	11,102		15,543	B	1.4	-17%dec from 1997, Roby etal. 1998		Collis etal. 2002 Trans. Am Fish
OR	3 Mile Canyon I	1999	CAGU/RBGU	9,338		13,073	B	1.4			Antolos MS Thesis
OR	3 Mile Canyon I	2000	CAGU/RBGU	9,573		13,402	B	1.4		Brad Ryan [David Craig], NOAA estimated 10,000 for each year 2000 - 2002	Antolos MS Thesis
OR	3 Mile Canyon I	2001	CAGU/RBGU	8,836		12,370	B	1.4			Antolos MS Thesis
OR	3 Mile Canyon I	2002	CAGU/RBGU		4,550	9,100	P	2	CAGU ~ 4000 - 5000 pairs RBGU ~50pairs; Pers. comm w/ R Morgan suspicious of spp %. He'll check notes; suggests using GULL until he confirms.	Brad Ryan [David Craig], NOAA estimated 10,000 for each year 2000 - 2002	R. Morgan pers. comm. In Seto etal. 2003
WA	Crescent I	1996	CAGU	3,334		4,668	B	1.4			Roby etal. 1999; 1998 Ann Rept
WA	Crescent I	1997	CAGU	5,769		8,077	B	1.4	+73%inc from 1996, Roby etal. 1998		Collis etal. 2002 Trans. Am Fish
WA	Crescent I	1998	CAGU	4,597		6,436	B	1.4	-20%dec from 1997, Roby etal. 1998		Collis etal. 2002 Trans. Am Fish
WA	Crescent I	1999	CAGU	4,929		6,901	B	1.4			Antolos MS Thesis
WA	Crescent I	2000	CAGU	4,262		5,967	B	1.4			Antolos MS Thesis
WA	Crescent I	2001	CAGU	2,690		3,766	B	1.4			Antolos MS Thesis

Estimated # of Breeding Birds

Year	Memaloose + Miller Rk + 3 Mile	Crescent
1977	10,636	
1996	15,357	4,668
1997	25,238	8,077
1998	19,093	6,436
1999		6,901
2000	16,202	5,967
2001	15,170	3,766
2002	11,480	??

CAGU = California Gull
GWWG = Glaucous-winged x Western Gull Hybrid
RGBU = Ring-billed Gull

What Counted: N = nests B = birds
Birds on the colony is an underestimate of the total # of breeding birds

File: WA gull & corm estimates.xls; sheet CAGU & RBGU

Summary of California and Ring-billed Gull Colony Surveys in Washington and Columbia River Colonies in Oregon

STATE	SITE NAME	YEAR	SPECIES	# BIRDS	# NESTS	Est. # Breeding Birds	WHATCOUNT*	CONVERSION	NOTES	NOTES	SOURCE
WA	Richland	1977	CAGU		386	772	N	2	direct count	In Conover 1983 reported CAGU 3600	Conover etal. 1979
WA	Richland	1977	RBGU		339	678	N	2	direct count	In Conover 1983 reported RBGU 4710	Conover etal. 1979
WA	Richland I	1996	CAGU/RBGU	17,793		24,910	B	1.4			Roby etal. 1999; 1998 Ann Rept
WA	Richland I	1997	CAGU/RBGU	18,820		26,348	B	1.4	+6%inc from 1996, Roby etal 1999		Collis etal. 2002 Trans. Am Fish
WA	Richland I	1998	CAGU/RBGU	22,348		31,287	B	1.4	+19%inc from 1997, Roby etal. 1999		Collis etal. 2002 Trans. Am Fish
WA	Richland I	2000	CAGU/RBGU	19,000		26,600	B	1.4		quick visual estimates by D. Craig	Brad Ryan, NOAA, pers comm
WA	Richland I	2001	CAGU/RBGU	19,000		26,600	B	1.4		quick visual estimates by D. Craig	Brad Ryan, NOAA, pers comm
WA	Richland I	2002	CAGU/RBGU	19,000		26,600	B	1.4		quick visual estimates by D. Craig	Brad Ryan, NOAA, pers comm
WA	Island #18	1977	CAGU		213	426	N	2		In Conover 1983 reported CAGU 5,610	Conover etal. 1979
WA	Island #18	1977	RBGU		863	1,726	N	2		In Conover 1983 reported RBGU 4,492	Conover etal. 1979
WA	Island #18	1996	CAGU/RBGU	17,096		23,934	B	1.4			Collis etal., 1999, 1998 Ann Rept
WA	Island #18	1997	CAGU/RBGU	14,495		20,293	B	1.4	-15% dec from 1996, Roby etal 1996		Collis etal. 2002 Trans. Am Fish
WA	Island #18	1998	CAGU/RBGU	12,669		17,737	B	1.4			Collis etal. 2002 Trans. Am Fish
WA	Island #18	2000	CAGU/RBGU	12,000		16,800	B	1.4		quick visual estimates by D. Craig	Brad Ryan, NOAA, pers comm
WA	Island #18	2001	CAGU/RBGU	12,000		16,800	B	1.4		quick visual estimates by D. Craig	Brad Ryan, NOAA, pers comm
WA	Island #18	2002	CAGU/RBGU	12,000		16,800	B	1.4		quick visual estimates by D. Craig	Brad Ryan, NOAA, pers comm

Estimated # of Breeding Birds

Richland + Is 18	
1977	3,602
1982	check
1996	48,845
1997	46,641
1998	49,024
2000	43,400
2001	43,400
2002	43,400

CAGU = California Gull
GWWG = Glaucous-winged x Western Gull Hybrid
RGBU = Ring-billed Gull

What Counted: N = nests B = birds
Birds on the colony is an underestimate of the total # of breeding birds

File: WA gull & corm estimates.xls; sheet CAGU & RGBU

STATE	SITE NAME	YEAR	SPECIES	# BIRDS	# NESTS	Est. # Breeding Birds	WHATCOUNT*	CONVERSION	NOTES	NOTES	SOURCE
WA	Cabin I	1977	CAGU		2	4	N	2			Conover etal. 1979
WA	Cabin I	1995	CAGU		100	200	P	2	estimated breeding population	Cabin I, 1.5km upstream of Priest Rapids Dam.	York etal. 2000
WA	Cabin I	1977	RBGU		125	250	N	2			Conover etal. 1979
WA	Cabin I	1995	RBGU		3,500	7,000	N	2	estimated breeding population	Cabin I, 1.5km upstream of Priest Rapids Dam	York etal. 2000
WA	Cabin I	2000	RBGU	0	0	0			Supported a large RBGU colony in past; 0 nesting gulls due to shooting & egg oiling	Nest habitat now unfavorable	M.Antolos 7/22/00 email
WA	Potholes Res.	1950	GULL	0					colonies started up at Potholes in 1952-53; Previously at Moses Lk.		Conover etal. 1979
WA	Potholes Res.	1977	CAGU		218	436	N	2			Conover etal. 1979
WA	Potholes Res.	1997	CAGU		595	1,190	N	2	Finger&Tabor have 438 nests in 1977; Conover has 436 breeding birds	3 colonies	Finger & Tabor 1997
WA	Potholes Res.	1982-1997	CAGU							pop increased by 36% [see note to left]	Finger & Tabor 1997
WA	Potholes Res.	1977	RBGU		1,146	2,292	N	2			Conover etal. 1979
WA	Potholes Res.	1997	RBGU		2,846	5,692	N	2	Finger&Tabor have 2292 nests in 1977; Conover has 2292 breeding birds	5 colonies	Finger & Tabor 1997
WA	Potholes Res.	1982-1997	RBGU							pop increased by 24% [see note to left]	Finger & Tabor 1997
WA	Potholes Res.	2001	GULL	4,297		6,016	B	1.4	Solstice I		Antolos MS Thesis
WA	Banks Lake	1977	CAGU		845	1,690	N	2			Conover etal. 1979
WA	Banks Lake	1977	RBGU		2,718	5,436	N	2			Conover etal. 1979
WA	Goose I, Banks Lk	2002	CAGU/RBGU		600	1,200	P	2	perhaps 500-1,000 pairs based on area used for nesting	GUESSTIMATE LATE IN THE SEASON BASED ON COLONY AREA C. Thompson	Seto etal. 2003
WA	Unamed I #2, Banks Lk	2002	CAGU/RBGU		6,000	12,000	P	2	perhaps 6,000-10,000 pairs based on area used for nesting	GUESSTIMATE LATE IN THE SEASON BASED ON COLONY AREA C. Thompson	Seto etal. 2003
WA	Sprague Lk	1977	CAGU		214	428	N	2			Conover etal. 1979
WA	Sprague Lk, Harper Is	2000	CAGU		2,500	5,000	P	2	Is supported 2000-3000 pairs of RBGU & same # CAGU		M.Antolos 7/10/00 email
WA	Sprague Lk	1977	RBGU		851	1,702	N	2			Conover etal. 1979
WA	Sprague Lk, Harper Is	2000	RBGU		2,500	5,000	P	2	Is supported 2000-3000 pairs of RBGU & same # CAGU		M.Antolos 7/10/00 email
OR/ WA	5 of 17 Islands b/w Chief Joseph Dam - Dalles Dam	1995	CAGU/RBGU			35,000	?			Gull colonies on 17 islands in this 310 mi stretch. Gull pops on 5 of the 17 islands estimated at 35000 NBB	York etal. 2000
	17 of 17 islands	1995	CAGU/RBGU			~59,000	?			Summation of unpublished data tables.	York etal. Unpubl. Data.

Estimated # of Breeding Birds

Cabin I	
1977	254
1995	7,200
2000	0

Estimated # of Breeding Birds

Potholes	
1950	0
1977	2,728
1997	6,882
2001	6,016

Estimated # of Breeding Birds

Banks Lake	
1977	7,126
2002	13,200

Estimated # of Breeding Birds

Sprague Lake	
1977	2,130
2000	10,000
2002	0

Most Recent Estimate of Breeding Birds RBGU & CAGU	
Total	88,262
Non-River	29,216
River	59,046
Estuary	400
Upriver	58,646

CAGU = California Gull
GWWG = Glaucous-winged x Western Gull Hybrid
RGBU = Ring-billed Gull

What Counted: N = nests B = birds
Birds on the colony is an underestimate of the total # of breeding birds

File: WA gull & corm estimates.xls; sheet CAGU & RGBU

Figure 1 – All Projects – Grand Total Birds Hazed by year

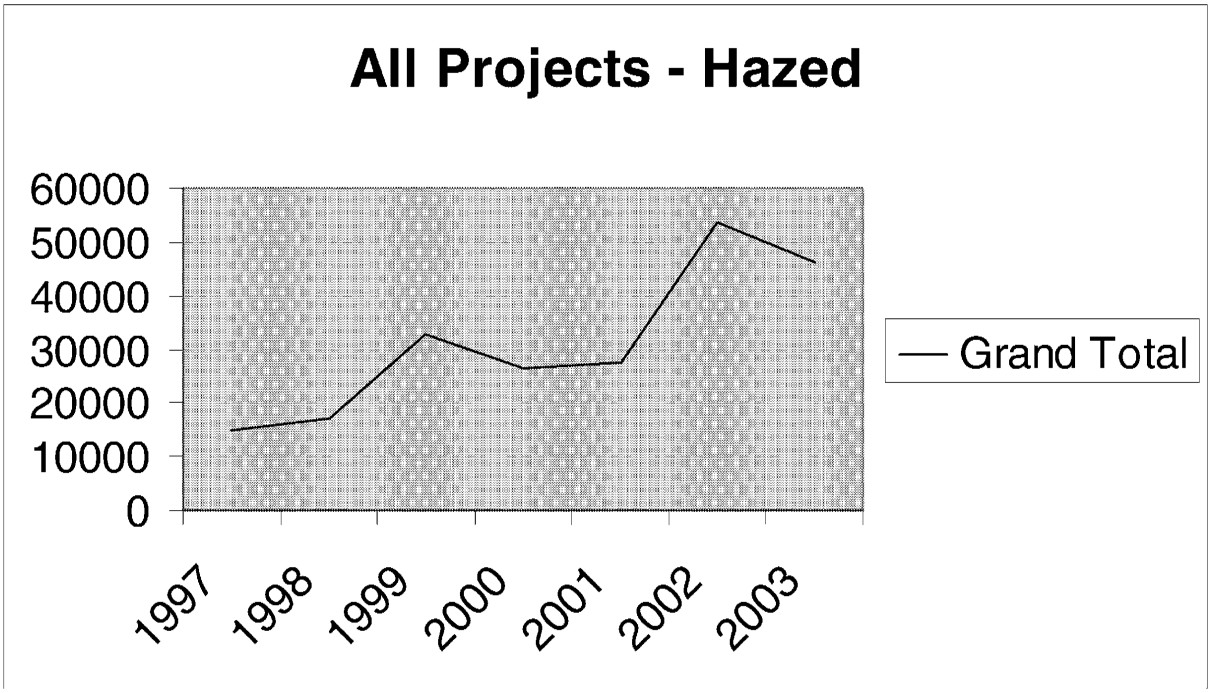


Figure 2 – All Projects – Grand Total Birds Killed by year

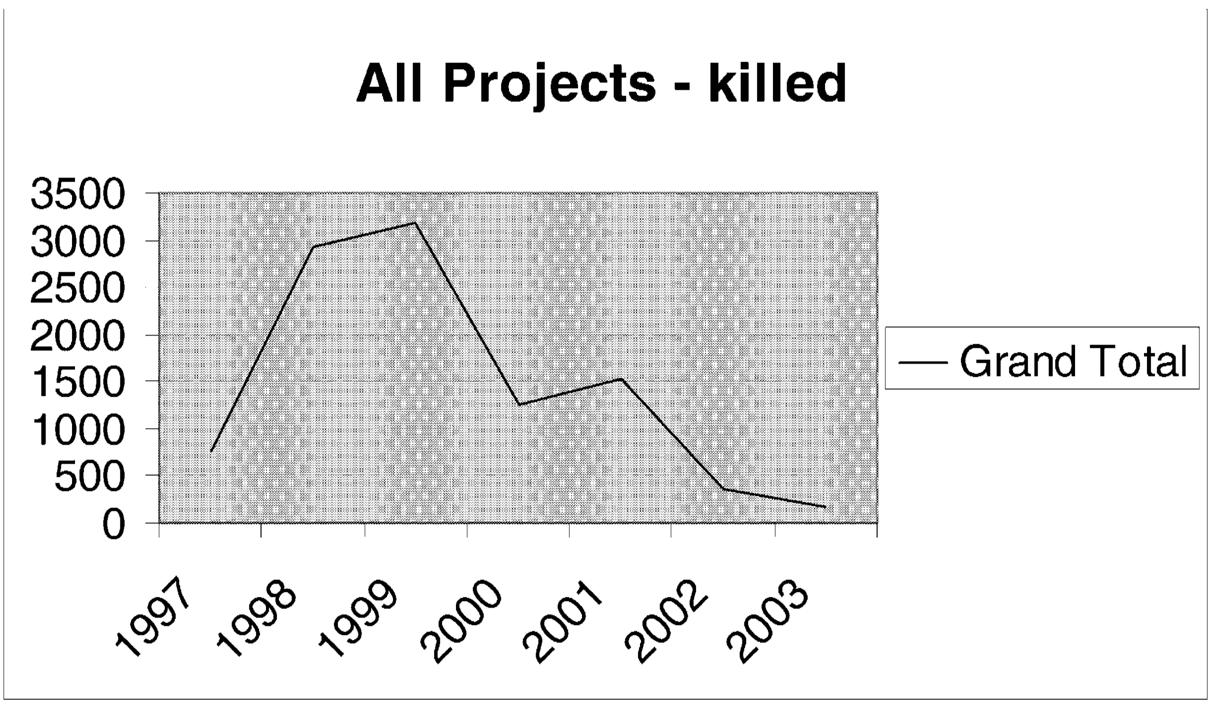


Figure 3 – All Projects – Gulls Killed by year and species

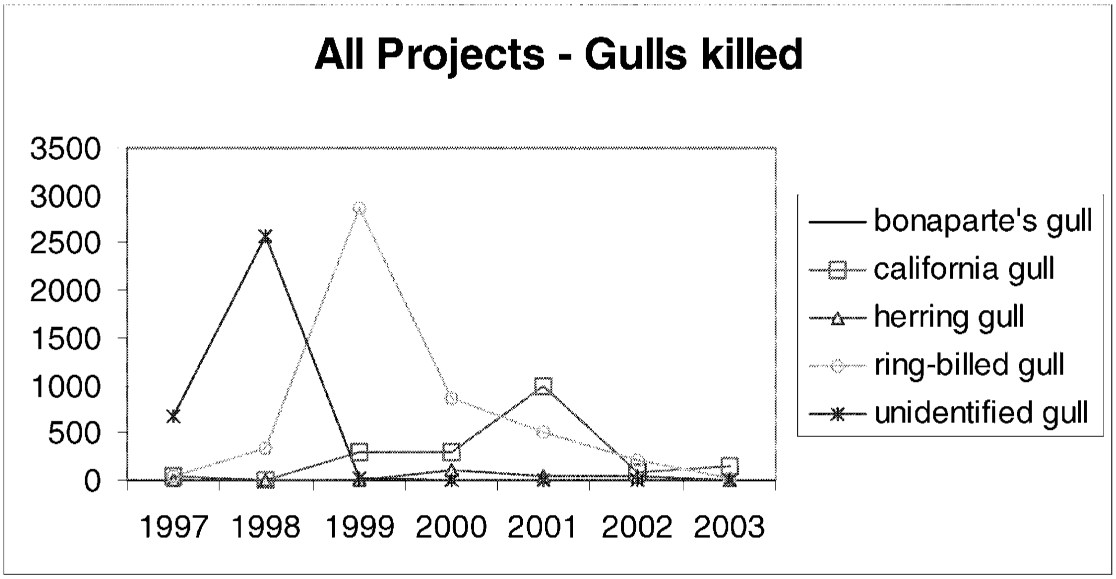


Figure 4 – Bonneville – Gulls Killed by year and species

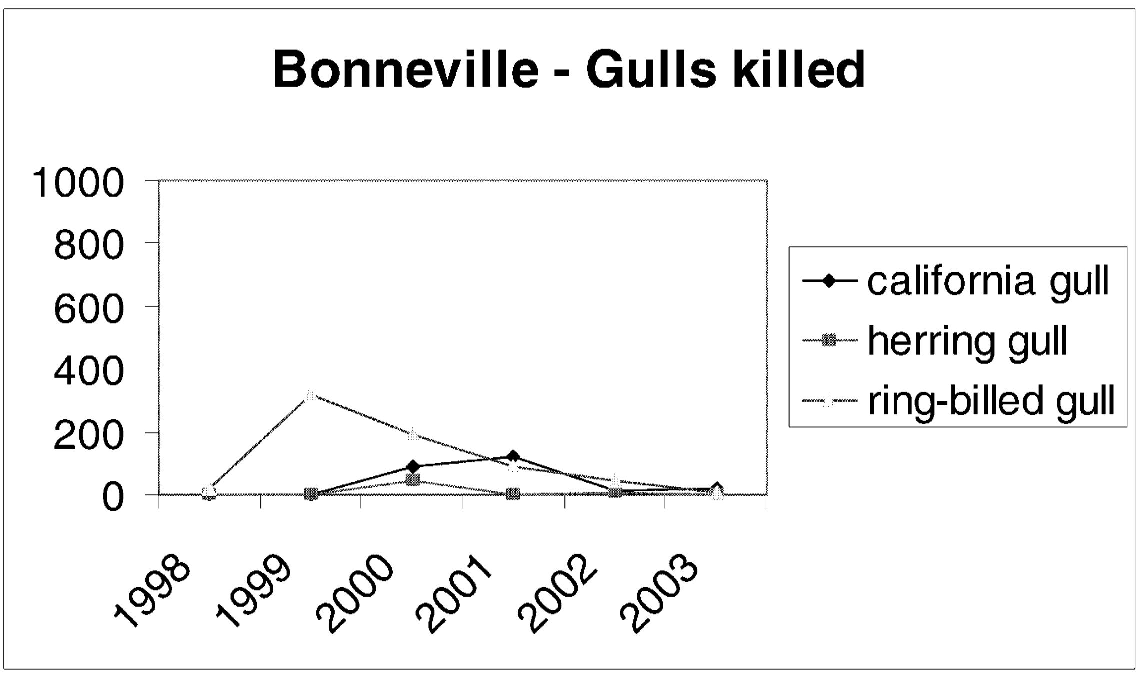


Figure 5 – John Day – Gulls Killed by year and species

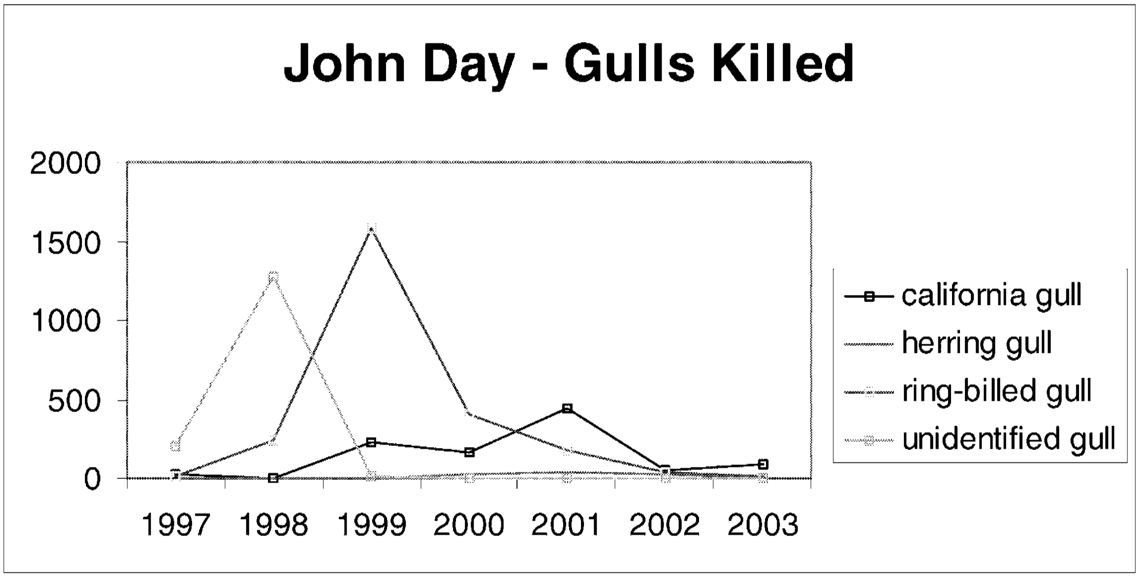


Figure 6 – The Dalles – Gulls Killed by year and species

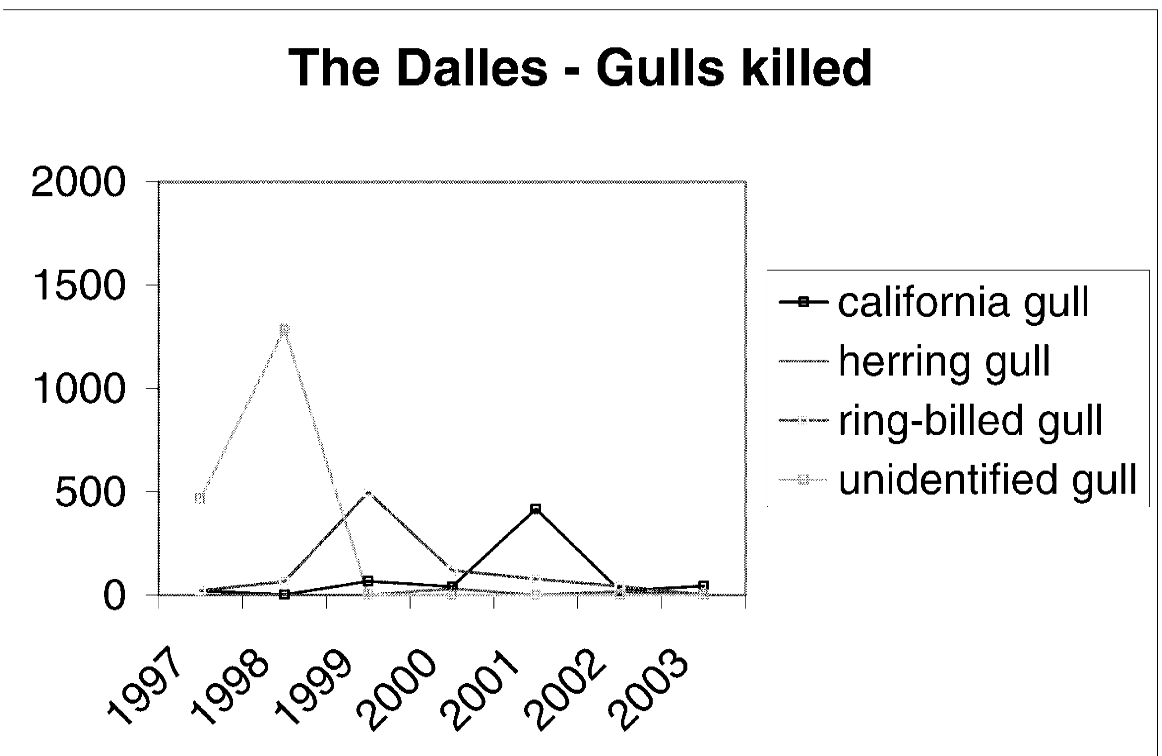


Figure 7 – McNary – Gulls Killed by year and species

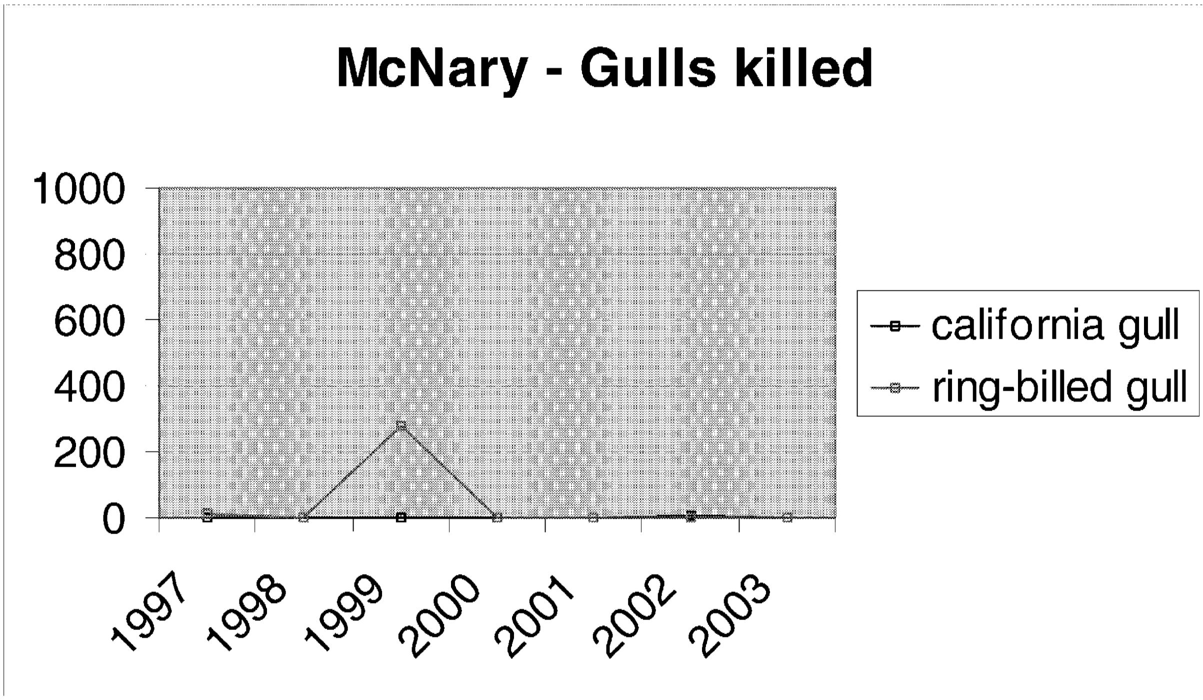


Figure 8 – Lower Monumental – Gulls Killed by year and species

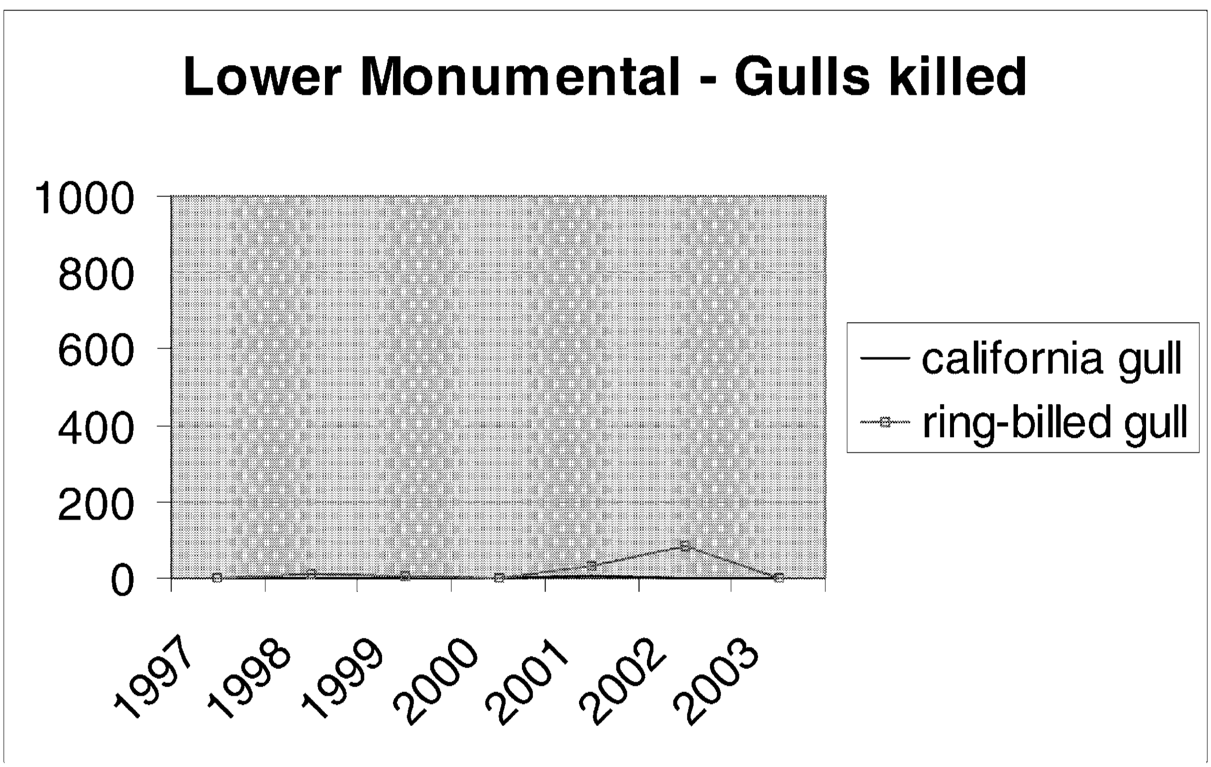


Figure 9 – Little Goose – Gulls Killed by year and species

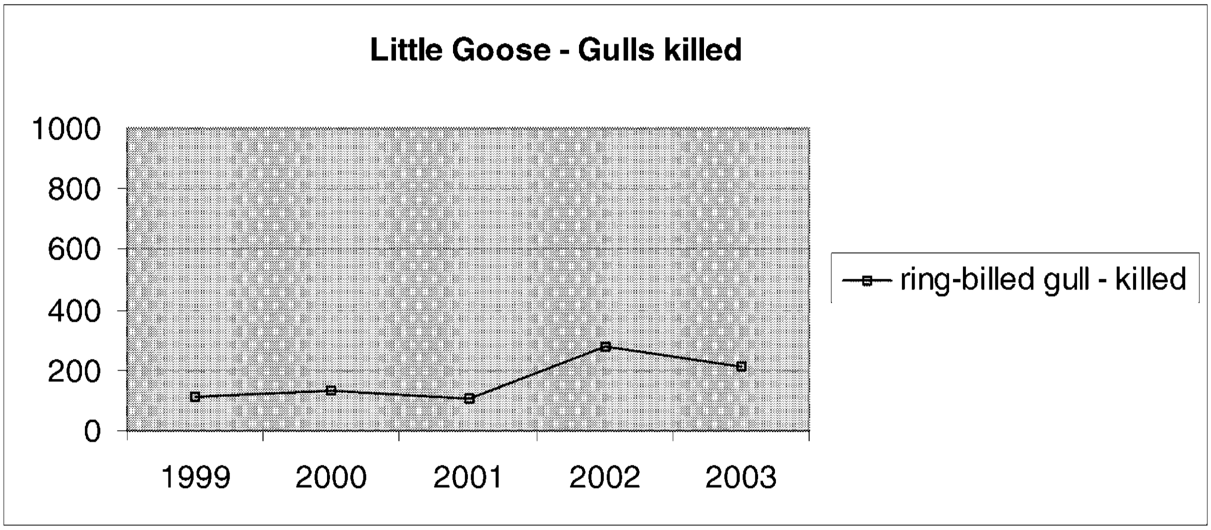
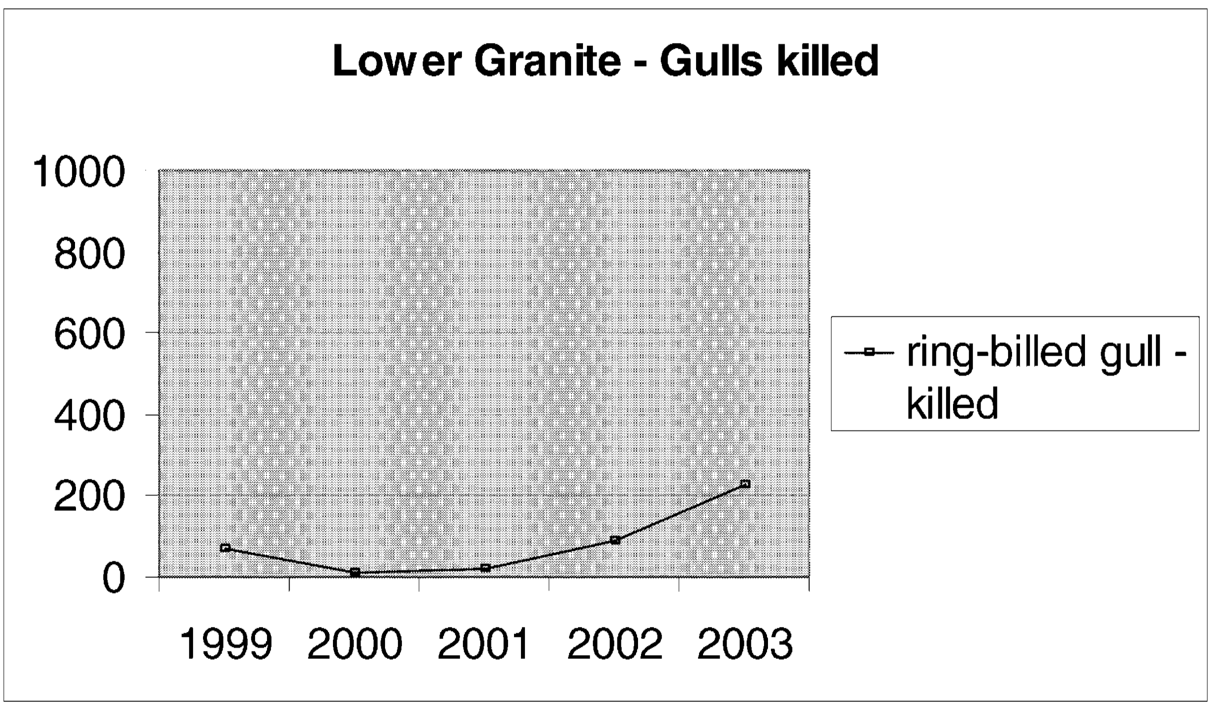


Figure 10 – Lower Granite – Gulls Killed by year and species



Double-crested Cormorants

Figure 11 – All Projects – Double-crested Cormorants Killed by year

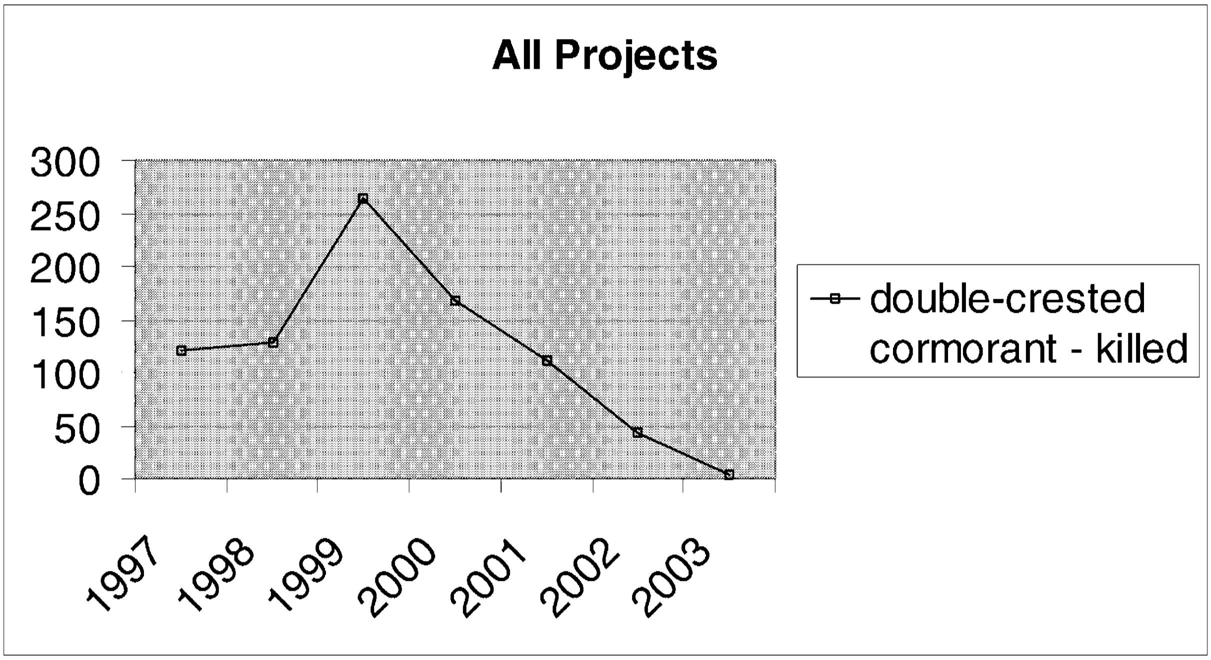


Figure 12 – Bonneville – Double-crested Cormorants Killed by year

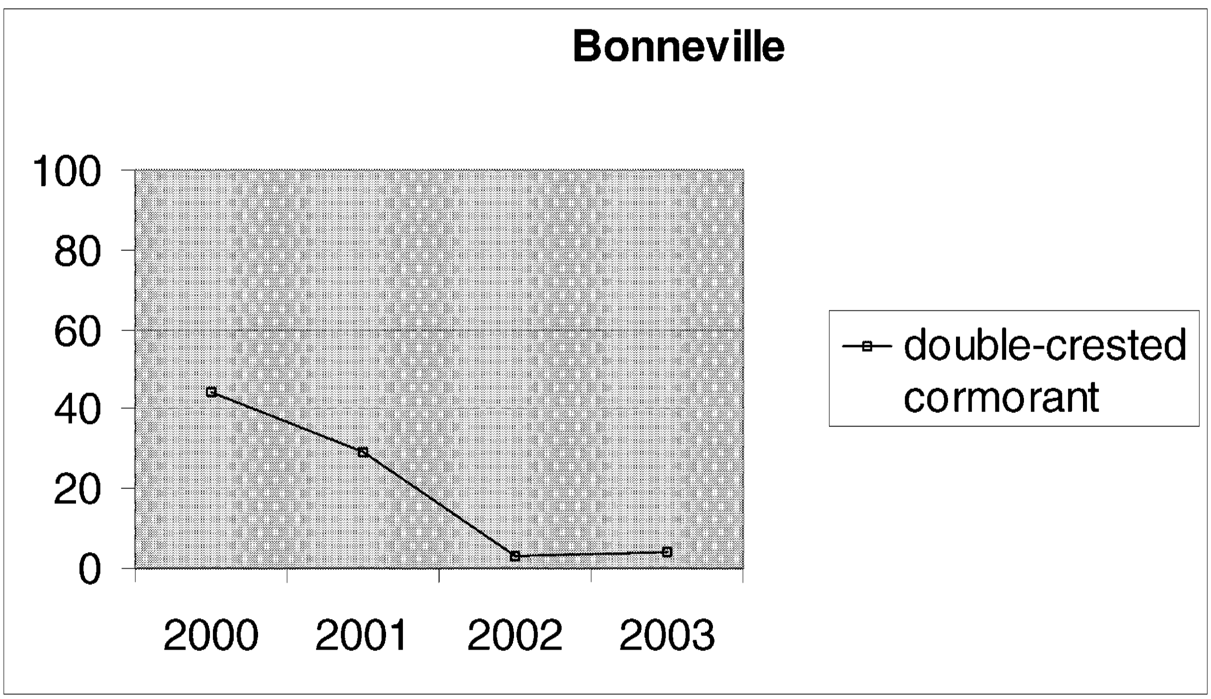


Figure 13 – John Day – Double-crested Cormorants Killed by year

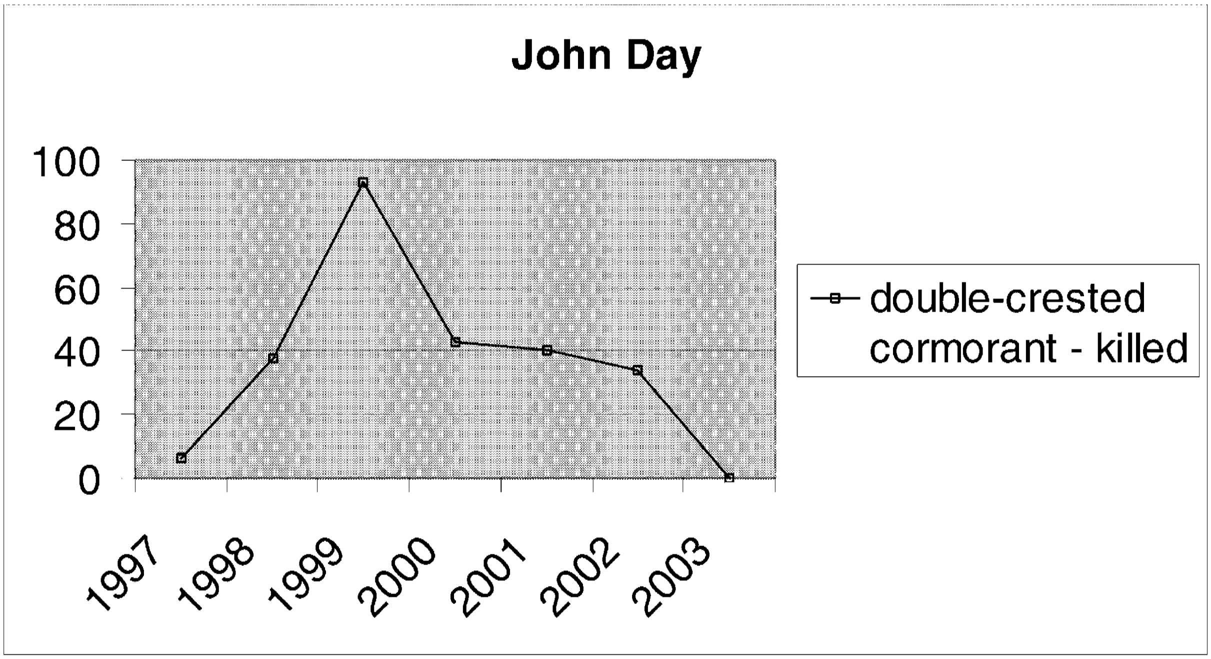


Figure 14 – The Dalles – Double-crested Cormorants Killed by year

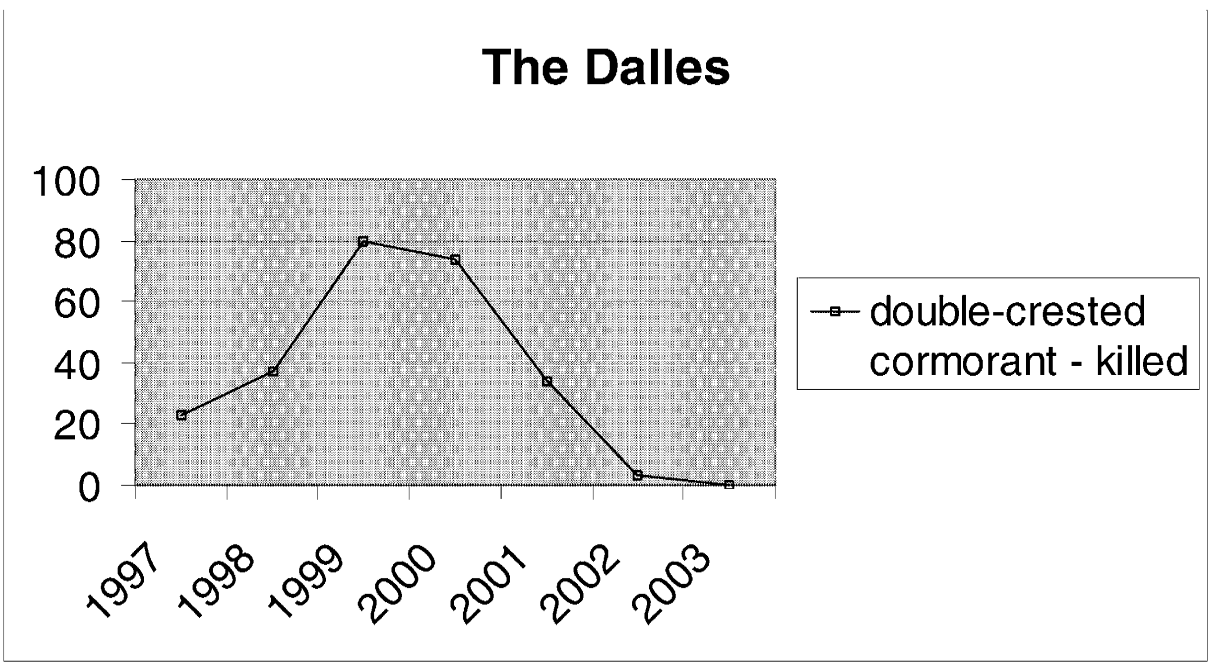


Figure 15 – McNary – Double-crested Cormorants Killed by year

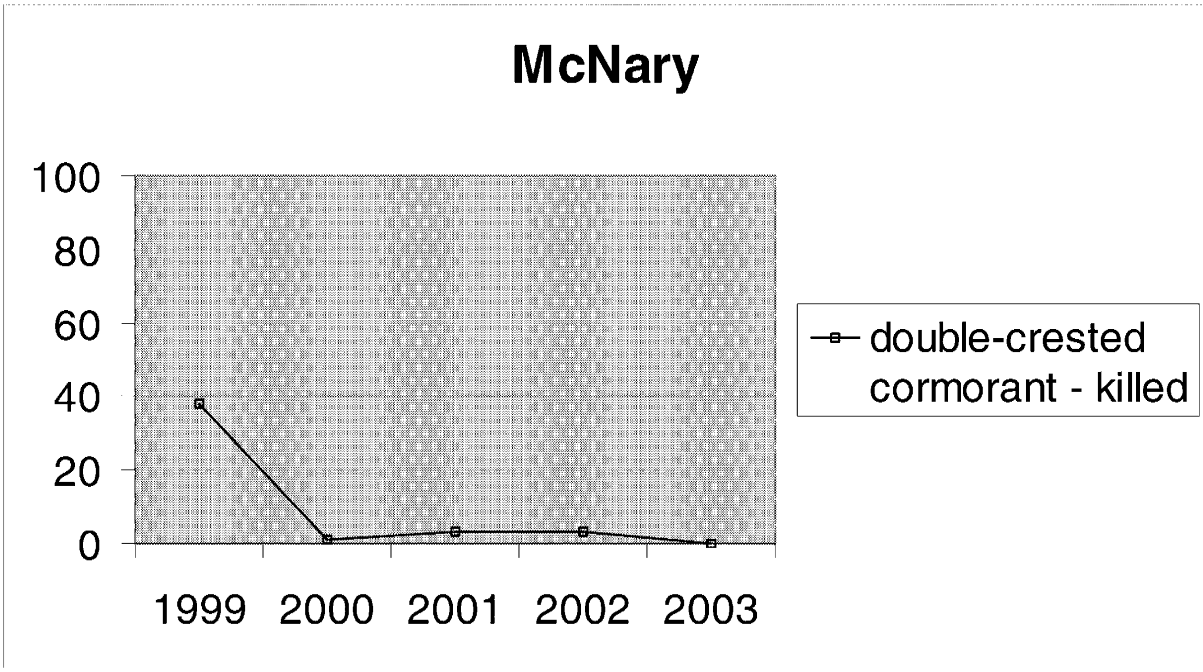


Figure 16 – Lower Monumental – Double-crested Cormorants Killed by year

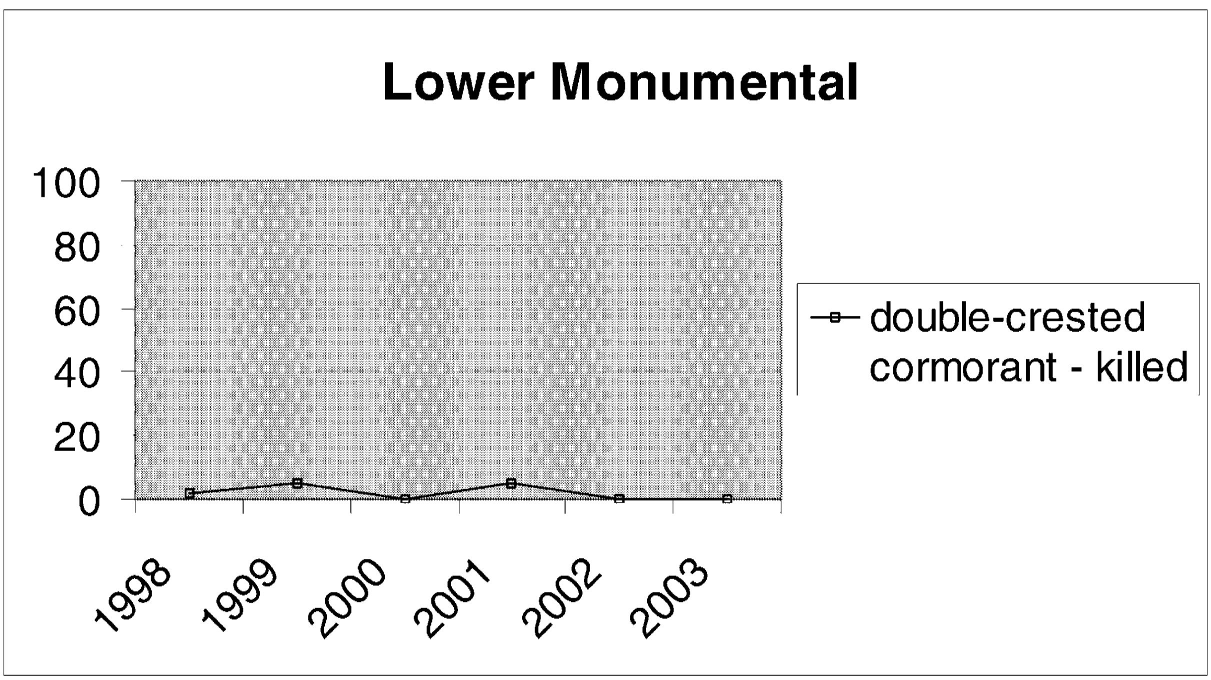


Figure 17 – Ice Harbor – Double-crested Cormorants Killed by year

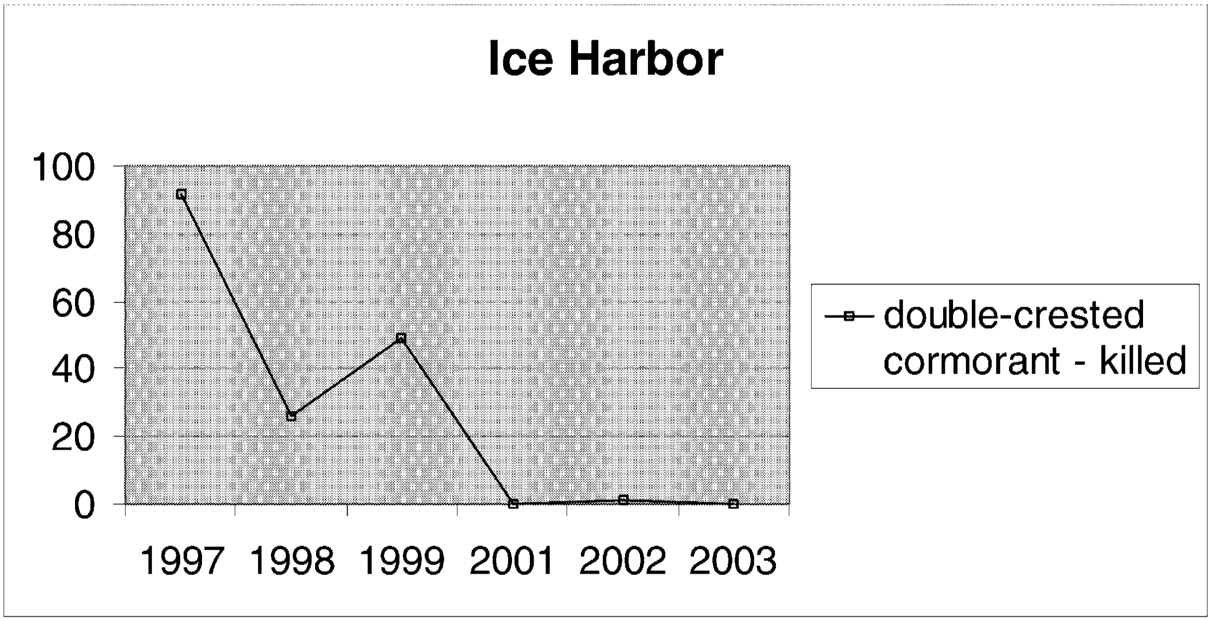


Figure 18 – Lower Granite – Double-crested Cormorants Killed by year

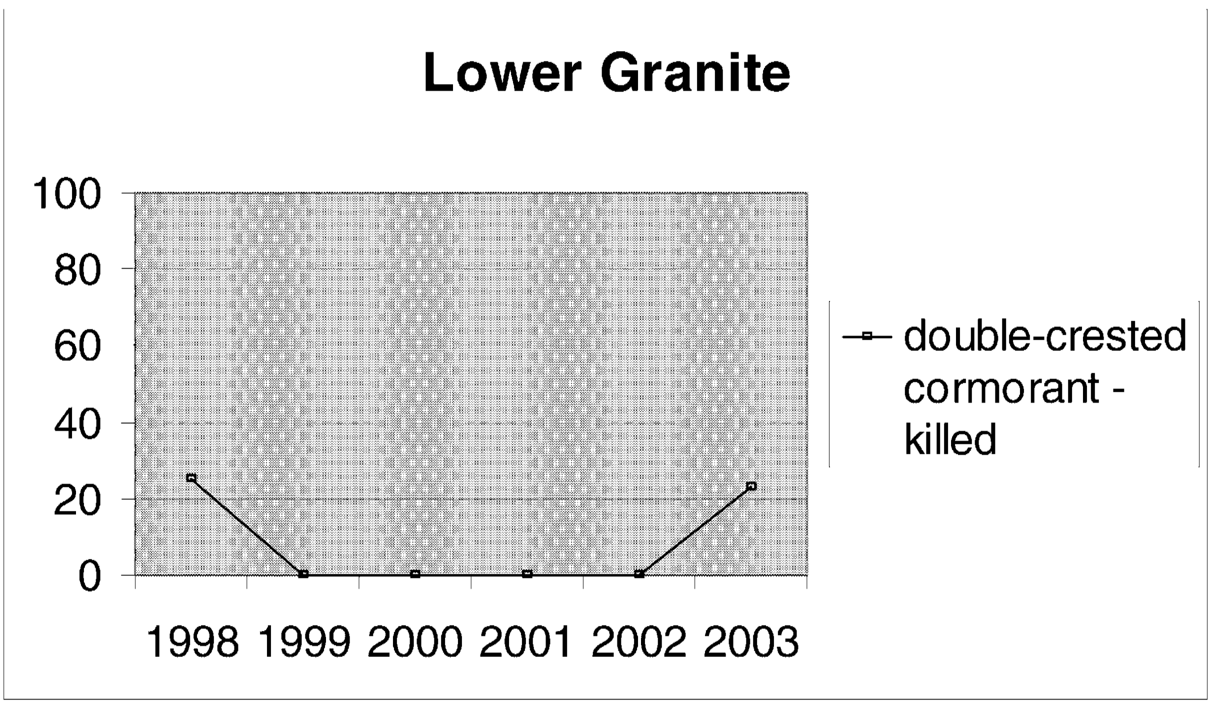
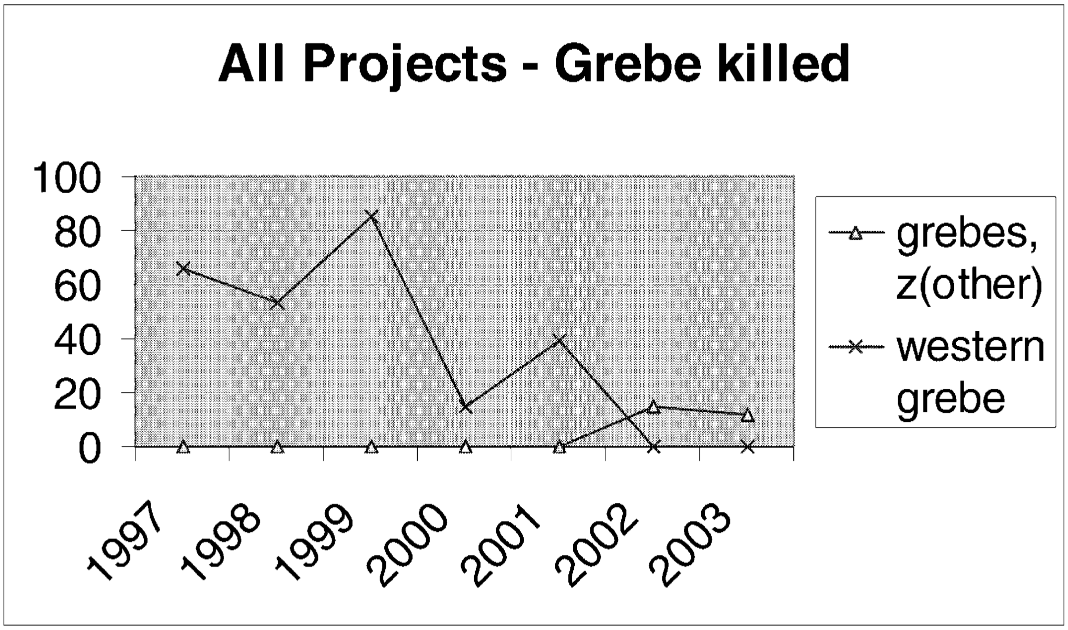


Figure 19 – All Projects – Grebe Killed by year and by species



Appendix G Tables (amended; as provided during the comment period)

Table G-1 – Yearly Summary of Species Hazed and Killed at All Project Sites

Project	(All)							
		Year						
Species	Data	1997	1998	1999	2000	2001	2002	2003
american white pelican	killed	0	0				0	0
	hazed	2	6				489	2896
belted kingfisher	killed				0		0	
	hazed				7		4	
bonaparte gull	killed						0	0
	hazed						478	20
california gull	killed	44	5	366	227	986	94	153
	hazed	56	0	2893	7001	11157	16119	11757
caspian tern	killed	0		0	0	0	**1	0
	hazed	2		32	13	283	612	2144
common merganser	killed	1	0		0		0	0
	hazed	0	80		4		2	14
dabbling duck	killed				0			
	hazed				50			
diving duck	killed				0			
	hazed				12			
double-crested cormorant	killed	121	202	229	182	95	6	53
	hazed	1627	1999	1963	4256	4074	7583	3914
forster tern	killed						0	0
	hazed						63	24
great-blue heron	killed	0	7	0	0	0	0	0
	hazed	6	3	50	226	68	50	1
herring gull	killed	3	10	29	93	18	48	3
	hazed	0	0	0	1240	151	2767	1910
mallard	killed				0			
	hazed				15			
osprey	killed			0				
	hazed			12				
red-breasted merganser	killed				0			
	hazed				101			
ring-billed gull	killed	49	389	2844	906	499	530	457
	hazed	2670	2106	26125	24421	11365	29448	42799
unidentified grebe	killed						15	12
	hazed						823	132
unidentified gull	killed	675	2589		0			
	hazed	9689	14492		22			
western grebe	killed	66	73	80	4	35		
	hazed	1011	885	106	1824	510		
Total	killed	956	3265	3519	1319	1615	694	678
	hazed	15063	19571	31181	37952	27457	58478	65611

** unintentional take caused by a misdirected pyrotechnic

Table G-2 – Yearly Summary of Species Hazed and Killed at Bonneville

Project	**Bonneville**

		Year					
Species	Data	1998	1999	2000	2001	2002	2003
belted kingfisher	killed			0			
	hazed			1			
california gull	killed		62	30	122	13	16
	hazed		54	84	560	1190	1755
caspian tern	killed				0		0
	hazed				12		0
common merganser	killed			0			0
	hazed			4			14
dabbling duck	killed			0			
	hazed			18			
diving duck	killed			0			
	hazed			12			
double-crested cormorant	killed			45	29	1	5
	hazed			390	592	1376	60
great-blue heron	killed		0	0	0	0	0
	hazed		50	202	44	5	0
herring gull	killed		28	16	0	7	0
	hazed		0	35	11	502	1011
mallard	killed			0			
	hazed			15			
red-breasted merganser	killed			0			
	hazed			6			
ring-billed gull	killed	22	321	228	89	8	7
	hazed	40	900	935	360	1234	597
western grebe	killed			0			
	hazed			46			
Total	killed	22	411	319	240	29	28
	hazed	40	1004	1733	1579	4307	3437

Table G-3 – Yearly Summary of Species Hazed and Killed at The Dalles

Project	**The Dalles**

		Year						
Species	Data	1997	1998	1999	2000	2001	2002	2003
california gull	killed	22	5	70	42	414	22	45
	hazed	56	0	1225	2735	5201	9726	4896
caspian tern	killed				0	0	**1	0
	hazed				2	49	139	0
dabbling duck	killed				0			
	hazed				20			
double-crested cormorant	killed	23	55	80	68	25	0	0
	hazed	741	1159	875	2686	2117	2096	502
great-blue heron	killed	0	5		0	0		
	hazed	6	2		2	12		
herring gull	killed	1	2		33	2	18	0
	hazed	0	0		665	110	1446	115
red-breasted merganser	killed							
	hazed				95			
ring-billed gull	killed	23	92	493	124	70	29	3
	hazed	57	18	6109	9072	2966	4637	203
unidentified grebe	killed						0	0
	hazed						4	5
unidentified gull	killed	469	1292					
	hazed	2930	5046					
western grebe	killed	0	15	16	2	6		
	hazed	14	507	68	257	160		
Total	killed	538	1451	643	267	511	70	48
	hazed	3790	6225	8209	15277	10455	18048	5721

** unintentional take caused by a misdirected pyrotechnic

Table G-4 – Yearly Summary of Species Hazed and Killed at John Day

Project	John Day

		Year						
Species	Data	1997	1998	1999	2000	2001	2002	2003
belted kingfisher	killed				0			
	hazed				6			
california gull	killed	22		234	155	446	55	91
	hazed	0		1614	4182	5396	4588	4165
caspian tern	killed				0	0	0	0
	hazed				11	219	2	0
common merganser	killed	1						
	hazed	0						
dabbling duck	killed							
	hazed				12			
double-crested cormorant	killed	6	65	85	61	33	4	0
	hazed	161	177	121	1152	722	616	8
great-blue heron	killed		2		0	0	0	0
	hazed		1		22	12	1	0
herring gull	killed	2	8	1	44	16	23	3
	hazed	0	0	0	540	30	778	514
ring-billed gull	killed	13	260	1571	406	180	34	9
	hazed	54	59	11323	9591	3492	2739	477
unidentified grebe	killed						0	0
	hazed						654	127
unidentified gull	killed	206	1297		0			
	hazed	5134	9281		22			
western grebe	killed	66	58	64	2	24		
	hazed	997	378	38	1521	350		
Total	killed	110	393	1955	668	699	116	103
	hazed	1212	615	13096	17037	10221	9378	5291

Table G-5 – Yearly Summary of Species Hazed and Killed at McNary

Project	**McNary**

		Year						
Species	Data	1997	1998	1999	2000	2001	2002	2003
american white pelican	killed						0	0
	hazed						333	2594
bonaparte gull	killed						0	0
	hazed						478	20
california gull	killed						4	0
	hazed						615	941
caspian tern	killed						0	0
	hazed						330	1951
common merganser	killed		0					
	hazed		80					
double-crested cormorant	killed		29	10	3	3	0	0
	hazed		184	6	0	0	512	344
herring gull	killed						0	0
	hazed						19	270
forster tern	killed						0	0
	hazed						63	0
ring-billed gull	killed	11	3	275		2	3	0
	hazed	0	1654	2912		0	3575	5205
western grebe	killed					5		
	hazed					0		
unidentified gull	killed	0	0					
	hazed	150	165					
unidentified grebe	killed						15	12
	hazed						143	0
Total	killed	11	32	285	3	10	22	12
	hazed	150	2083	2918	0	0	6068	11325

Table G-6 – Yearly Summary of Species Hazed and Killed at Ice Harbor

Project	**Ice Harbor**

		Year					
Species	Data	1997	1998	1999	2001	2002	2003
american white pelican	killed	0	0			0	0
	hazed	2	6			273	152
belted kingfisher	killed					0	0
	hazed					4	0
caspian tern	killed	0		0		0	0
	hazed	2		32		141	40
california gull	killed						1
	hazed						0
common merganser	killed					0	0
	hazed					2	0
double-crested cormorant	killed	92	26	49	0	1	0
	hazed	725	470	942	108	2396	1089
Forster tern	killed						0
	hazed						24
great-blue heron	killed					0	0
	hazed					41	0
herring gull	killed					0	0
	hazed					22	0
osprey	killed			0			
	hazed			12			
ring-billed gull	killed	0	0	0	0	3	1
	hazed	1769	105	961	68	3757	11299
unidentified grebe	killed					0	0
	hazed					22	0
unidentified gull	killed	0					
	hazed	1475					
Total	killed	92	26	49	0	4	2
	hazed	3973	581	1947	176	6658	12604

Table G-7 – Yearly Summary of Species Hazed and Killed at Lower Monumental

Project	**Lower Monumental**

		Year						
Species	Data	1997	1998	1999	2000	2001	2002	2003
american white pelican	killed						0	0
	hazed						156	150
california gull	killed					4		
	hazed					0		
caspian tern	killed					0		0
	hazed					3		153
double-crested cormorant	killed		2	5	0	5	0	0
	hazed		9	19	28	515	587	1911
great-blue heron	killed						0	0
	hazed						3	1
ring-billed gull	killed	2	12	3	1	34	84	0
	hazed	790	230	1174	1335	2798	10653	16356
Total	killed	2	14	8	1	43	84	0
	hazed	790	239	1193	1363	3316	11399	18571

Table G-8 – Yearly Summary of Species Hazed and Killed at Little Goose

Project	**Little Goose**

		Year				
Species	Data	1999	2000	2001	2002	2003
double-crested cormorant	killed		5			25
	hazed		0			0
ring-billed gull	killed	111	135	102	280	212
	hazed	1030	1589	820	1269	5146
Total	killed	111	140	102	280	237
	hazed	1030	1589	820	1269	5146

Table G-9 – Yearly Summary of Species Hazed and Killed at Lower Granite

Project	**Lower Granite**

		Year					
Species	Data	1998	1999	2000	2001	2002	2003
double-crested cormorant	killed	25					23
	hazed	0					0
ring-billed gull	killed		70	12	19	89	225
	hazed		1716	1891	829	1624	3516
Total	killed	25	70	12	19	89	248
	hazed	0	1716	1891	829	1624	3516

US Army Corps
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Walla Walla District
Portland District

Environmental Assessment

Avian Predation Deterrent Program for the Protection of Salmonids, Lower Columbia and Snake Rivers Dams, Washington and Oregon

March 2005

Lead Agency:	U.S. Army Corps of Engineers Portland and Walla Walla Districts
Under Contracted Assistance from:	U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, Western Region

Summary

This Environmental Assessment (EA) addresses the environmental impacts of the Corps' Avian Predation Deterrent (APD) Program. This program implements the requirements of the National Marine Fisheries Service's (NMFS) Final Biological Opinion on the Reinitiation of Consultation on Operation of the Federal Columbia River Power System (FCRPS) (2000) Reasonable and Prudent Alternative (RPA) action 101. The RPA states the Corps shall implement and maintain an effective means of discouraging avian predation at the FCRPS dams where avian predator activity is observed.

Pertinent and current information available in the *Columbia River System Operation Review EIS* (CORPS et al. 1995) and the *Lower Snake River Juvenile Salmon Migration Feasibility Report/EIS* (CORPS et al. 2002a) have been incorporated by reference. This EA is tiered off these two Environmental Impact Statements (EIS's).

The No-Action (No Change) Alternative represents the current program. The current program consists of technical assistance, non-lethal and lethal control methods (tools), and research and development, as described in the body of this environmental assessment. Other alternatives considered were Non-Lethal Tools Only, Exhaust all Non-Lethal Tools First, No Corps Program, and Lethal Tools Only.

The proposed program was evaluated for its affect on threatened and endangered species. The determination was made that the program "may affect, but is not likely to adversely affect" bald eagles, bull trout, Snake River spring/summer and fall Chinook salmon, sockeye salmon and steelhead, Upper Columbia River spring Chinook salmon and steelhead, Lower Columbia River chum salmon, Chinook salmon, and steelhead and Mid-Columbia River steelhead. A "no effect" determination was made for the other listed species. The EA also evaluates the effects on birds that would be hazed or killed under the program.

When taken together with other past, present, and reasonably foreseeable future actions, the current program would have no significant environmental impact. This finding is consistent with that of the United States Department of Agriculture (USDA), which manages animal damage control programs on a regional and national level and carries out the Corps' APD program, under contract. USDA documented their findings on a regional level in an EA, *Alternative Strategies for the Management of Damage Caused by Migratory Birds in the State of Washington* (USDA-APHIS-WS, 2001). USDA documented their findings on a national level in an EIS, *Animal Damage Control Program*) (USDA-APHIS-ADC, 1997, revised).

This EA has been prepared in compliance with the National Environmental Policy Act (NEPA) and currently no significant impacts have been identified. If no significant impacts are identified during the public review process, an EIS will not be required and full compliance with NEPA would be achieved once a Finding of No Significant Impact (FONSI) is signed.

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LIST OF ACRONYMS AND ABBREVIATIONS

ADC	Animal Damage Control (former name of Wildlife Services program)
APD	Avian Predation Deterrent
APHIS	Animal and Plant Health Inspection Service (USDA agency)
APHIS-WS	Wildlife Services (USDA-APHIS program)
BA	Biological Assessment
BBS	Breeding Bird Survey
BiOp	Biological Opinion
BPA	Bonneville Power Administration
CAA	Clean Air Act
CAR	Coordination Act Report
CBC	Christmas Bird Count
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMZA	Coastal Marine Zoning Act
Corps	United States Army Corps of Engineer
CR	Conservation Recommendation
CRGSA	Columbia River Gorge Scenic Area
CRITFC	Columbia River Intertribal Fish Commission
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CWA	Clean Water Act
CY	Calendar Year
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
EPA	Environmental Protection Agency
e.g.	exempli gratia (for example)
et al.	et alia (and others)
et seq.	et sequen[s] (and the following one[s])
FCA	Flood Control Act
FCRPS	Federal Columbia River Power System
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodentcide Act
FONSI	Finding Of No Significant Impact
FPOM	Fish Passage Operations and Maintenance Coordination Team
FR	Federal Register
FY	Fiscal Year
GBT	Gas Bubble Trauma
INAD	Investigational New Animal Drug
i.e.	id est (that is)
ITS	Incidental Take Statement
IWDM	Integrated Wildlife Damage Management
MA	methylene antanile

MBTA	Migratory Bird Treaty Act
MIS	Management Information System
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Audubon Society
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPPC	Northwest Power Planning Council
NWRC	National Wildlife Research Center
OAHP	Office of Archeological and Historic Properties
OSDA	Oregon State Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
PL	Public Law
PIT	Passive Integrated Transponder
PUD	Public Utility District
RCRA	Resource Conservation Recovery Act
RM	River Mile
RPA	Reasonable and Prudent Alternative
RHA	River and Harbor Act
SHPO	State Historic Preservation Office
SWD	Seattle Water Department
TDG	Total Dissolved Gas
USC	United States Code
USBR	United States Bureau of Reclamation
USDA	United States Department of Agriculture
USDC	United States Department of Commerce
USDI	United States Department of Interior
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WSDA	Washington State Department of Agriculture
WOS	Washington Ornithological Society

Environmental Assessment
Avian Predation Deterrent Program
Lower Columbia and Lower Snake Rivers

1.0 PURPOSE AND NEED

1.1 Introduction

The U.S. Army Corps of Engineers (Corps) is experiencing losses of Federally listed juvenile salmonid fish to piscivorous (fish-eating) birds at the eight hydroelectric dams (projects) operated by the Corps on the Lower Columbia and Lower Snake Rivers in the States of Oregon and Washington. Ten species of anadromous salmonids listed under the Endangered Species Act (ESA) are found throughout portions of the Lower Columbia and Lower Snake Rivers that are affected by these dams. Piscivorous birds congregate in the tailrace area below the dams in spring and summer to feed on congregated fish, and among them, out-migrating juvenile salmonids. Juvenile salmonids are especially vulnerable to predation by birds and other predators when released at the bypass facilities or brought to the surface of the tailrace, and some suffer additional predation because they are disoriented or stunned due to passage through turbines and spillways.

Under the ESA, Federal agencies must consult with NMFS and U.S. Fish and Wildlife Service (USFWS) to ensure that Federal actions do not jeopardize the continued existence of ESA listed species. The Corps, in conjunction with several other Federal agencies, entered into formal consultation with NMFS and USFWS for the operation of the FCRPS, which included the eight dams. NMFS reviewed the effects of the FCRPS on listed anadromous fish in the Columbia River basin and developed a Biological Opinion (BiOp), *Final Biological Opinion on the Reinitiation of Consultation on* Operation of the Federal Columbia River Power System (NMFS 2000b). In the NMFS FCRPS BiOp, NMFS identified Incidental Take Statements (ITS), Conservation Recommendations (CR), and Reasonable and Prudent Alternative (RPA) actions to mitigate impacts to listed anadromous species. One of these actions, RPA action 101 states:

> Action 101: *The Corps, in coordination with the NMFS Regional Forum process, shall implement and maintain effective means of discouraging avian predation (e.g. water spray, avian predator lines) at all forebay, tailrace, and bypass outfall locations where avian predator activity has been observed at FCRPS dams. These controls shall remain in effect from April through August, unless otherwise coordinated through the Regional Forum process. This effort shall also include removal of the old net frames attached to the two submerged outfall bypasses a Bonneville Dam. The Corps shall work with NMFS, FPOM [Fish Passage Operations and Maintenance Coordination Team], USDA [U.S. Dept. of Agriculture] Wildlife Services, and USFWS [U.S. Fish and Wildlife Service] on recommendations for any additional measures and implementation schedules and report progress in the annual facility operating reports to NMFS. Following consultation with NMFS, corrective measures shall be implemented as soon as possible.*

The Corps has prepared this EA to describe the Corps' Avian Predation Deterrent (APD) Program and evaluate the alternatives and methods to implement this program in compliance with this RPA.

The FCRPS 2000 BiOp's Reasonable and Prudent Alternative (RPA) provides the baseline condition for which effect determinations are evaluated for ESUs affected by the FCRPS dams and projects. NMFS and USFWS have coordinated this multi-species opinion and the USFWS opinion on the effects of hydrosystem operations on Columbia River basin species within its jurisdiction, dated May 12, 2000. The two agencies intend the recommendations and requirements of these opinions to be mutually consistent. They represent the Federal biological resource agencies' recommendations of measures that are most likely to ensure the survival and recovery of all listed species and that are within the current authorities of the Action Agencies. The Fish Passage Operations Maintenance (FPOM) Coordination Team annually evaluates the current APD program. USFWS and NMFS are members of FPOM, which reviews the Corps' implementation of the 2000 Biological Opinion.

1.2 Location and Setting

This EA addresses the effects of the APD program at the eight Corps-operated hydroelectric dam projects on the Lower Columbia and Lower Snake Rivers, in Washington and Oregon. They are Bonneville, The Dalles, John Day, and McNary on the Lower Columbia River and Ice Harbor, Lower Monumental, Little Goose, and Lower Granite on the Lower Snake River. Plate 1 shows the geographic locations of the project sites.

The geographic boundary for the program includes the forebay, tailrace, and fish ladder(s) and fish outfall bypass at each dam. The boundary extends about 1,000 feet upstream and 1,000 feet downstream of each dam. It also includes the middle of the river area between Columbia River miles (RM) 140 to 144 where juvenile salmonids are released from trucks aboard barges. This release site may be moved to Bonneville Dam in the future, if an existing discharge system is modified.

1.3 Background

Prior to the NMFS 2000 BiOp, the Corps' avian predation deterrent program was identified in the Corp's Fish Passage Plan (Appendix D; CORPS 2004). The Plan originated around 1983 with the creation of the Northwest Power Planning Council and is reissued each calendar year. Excerpts from the current 2004 calendar year plan are contained in Appendix D. The Corps implements the program, with the assistance of the USDA Animal and Plant Health Inspection Service/Wildlife Services (APHIS-WS). Their expertise and assistance has been used to develop alternative strategies for the reduction in piscivorous bird predation at Corps operated hydroelectric dams. Initial efforts to reduce predation by piscivorous birds were focused on restricting overhead access (using exclusion wires) to areas where juvenile fish (smolts) are most susceptible to predation. In addition, an intensive hazing program reinforced with limited lethal control, where necessary, has been used under the current program to reinforce the effectiveness of non-lethal measures and remove persistent individual piscivorous birds.

The associated economic cost to mitigate the vulnerability of smolts below hydroelectric dams can be estimated in several ways. One way to estimate damage is to estimate the number of juvenile salmonids eaten by avian predators and apply a dollar value to each individual of each species. Another way to take into account the costs involved is to improve juvenile salmonid survival. The value of ESA-listed juvenile salmonids lost to predation is not presented in this EA, because it is not easily determined. Engemann et al. (in press) reviewed various methods for applying monetary valuations for ESA-listed species so that economic analyses of management actions could be used to help guide and evaluate management decisions. For example, the economic loss or relative value of juvenile salmonid to society, attributed to avian predation, may be represented by the costs associated with the development and implementation of mitigation measures that improve the survival of those juvenile salmonids past each hydroelectric dam. An example of the economic valuation process is presented in Table 1.1. The figures used are estimates and are provided for illustrative purposes only.

Table 1.1. Juvenile Salmonid Economic Valuation

Description	**Estimated Data**
Average cost per year for salmonid restoration program	$500 million
Anadromous adults recorded at Bonneville in 2001	4.4 million
Cost of restoration efforts per adult	$114
Local economic value of one adult (in 1998 dollars)	$186
Total value of one adult	$300
Number of Bonneville smolts required to produce one adult salmonid (average 2% smolt to adult return rate)	50
Average value of a juvenile salmonid individual	$ 6

1.4 Purpose and Need

The purpose of the APD Program is to implement and maintain an effective means of discouraging piscivorous bird predation at all forebay, tailrace, and bypass outfall locations at the eight Corps' dams on the Lower Columbia and Lower Snake Rivers, and related dam operation activities. This EA considers the issues and evaluates alternatives available to the APD Program that comply with the RPA action 101 of the NMFS 2000 BiOp.

1.5 Authority

1.5.1 Corps Authority

Each of the affected Corps dams is authorized to provide for slackwater navigation, irrigation, hydroelectric power generation, recreation, and fish and wildlife. This includes authority to protect fish and wildlife resources. Specific project authorization for each dam is listed below.

BONNEVILLE--BONNEVILLE POOL

The project was authorized by the Federal Emergency Administration Act of 1933, the River and Harbor Act (RHA) of 1935, the Bonneville Project Act of 1937; and Flood Control Act (FCA) of 1950 (Public Law [PL] 516). The FCA of 1944 modified the project for recreational facilities under Code 710. Bonneville Dam was dedicated in 1937. Bonneville second powerhouse was completed in 1982. Bonneville new navigation lock opened in 1993. Location is approximately Columbia RM 146.

THE DALLES--LAKE CELILO

The project was authorized by the FCA of 1950 to provide a dam, powerhouse, navigation lock and appurtenance facilities. The FCAs of 1944, 1946 and 1954 modified the project for recreational facilities under Code 710. The Dalles Lock and Dam was dedicated in 1957. Location is approximately Columbia RM 192.

JOHN DAY--LAKE UMATILLA

The project was authorized by the FCA of 1950 to provide a dam, power plant, navigation lock, and slack water lake. Authority to develop and maintain recreation facilities on water resource projects is authorized in Section 4 of FCA of 1944 (PL 534, 78th Congress) as amended by Section 207 of PL 87-874, and further amended by the Land and Water Conservation Fund Act of 1965. Authority to develop and maintain fish and wildlife facilities is authorized by the FCA of 1950 (PL 81-516). The John Day Lock and Dam Project was dedicated in 1968. Location is approximately Columbia RM 214.

McNARY LOCK AND DAM--LAKE WALLULA

The project was authorized by Section 2 of the FCA of 1945 (PL 79-14, 79th Congress, 1st Session), 2 March 1945, in accordance with House Document 704, 75th Congress, 3rd Session. The project was originally called Umatilla Dam, but the RHA of 1945 renamed the dam in honor of the late Senator Charles L. McNary.

Recreation was authorized in the FCA of 1944 (PL 78-534), as amended. The study to construct a second powerhouse at McNary Dam and Lake was authorized by the Water Resource Development Act of 1976 (PL 94-587). The second powerhouse was authorized for construction by the Water Resources Development Act of 1986 (PL 99-662, 99th Congress, 2nd Session), November 17, 1986, as specified by the report of the Chief of Engineers dated June 24, 1981. Location is approximately Columbia RM 292. The second powerhouse was deauthorized on November 16,1991.

ICE HARBOR LOCK AND DAM--LAKE SACAJAWEA

The Ice Harbor Project was authorized by Section 2 of the FCA of 1945 (PL 79-14, 79th Congress, 1st Session), March 2, 1945, in accordance with House Document 704, 75th Congress, 3rd Session. Recreation was authorized in the FCA of 1944, as amended (PL 78-534). Location is approximately Snake RM 10.

LOWER MONUMENTAL LOCK AND DAM--LAKE HERBERT G. WEST
The project was authorized by the FCA of 1945 (PL 79-14), in accordance with House Document 704. Recreation was authorized in the FCA of 1944 (PL 78-534), as amended. Location is approximately Snake RM 41.5.

LITTLE GOOSE LOCK AND DAM--LAKE BRYAN
The project was authorized by Section 2 of the FCA of 1945 (PL 79-14), 79th Congress, 1st Session, March 2, 1945, in accordance with House Document 704, 75th Congress, 3rd Session. Recreation was authorized in the FCA of 1944, as amended. Location is approximately Snake RM 70.

LOWER GRANITE LOCK AND DAM--LOWER GRANITE LAKE
The project was authorized by Section 2 of the FCA of 1945 (PL 79-14), 79th Congress, 1st Session, March 2, 1945, in accordance with House Document 704, 75th Congress, 3rd Session. Recreation was authorized in the RHA of 1944 as amended. Location is approximately Snake RM 107.5.

1.5.2 APHIS-WS Authority

The Corps has a work plan/financial plan with USDA APHIS-WS to perform avian predation deterrent activities at the eight dams. The USDA APHIS Wildlife Services program is given authority by the Animal Damage Control Act of 1931 (7 U.S.C. 426-426c; 46 Statute 1468) as amended, to use the most efficient and humane methods currently available for reducing or alleviating damage associated with wildlife. The Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988, as amended, authorized APHIS-WS to conduct activities and to enter into agreements and contracts with public and private agencies in the control of nuisance mammals and birds.

1.6 Scope of Analysis

This EA examines alternatives for the APD Program to reduce actual and potential predation by piscivorous birds on ESA-listed anadromous fish species at the eight dams.

The focus of this analysis is to evaluate alternatives that could implement RPA action 101. While the NMFS 2000 BiOp includes additional RPA actions (RPA's 102 and 103) related to avian predation, they involve long-term research studies and the results are not available for consideration in this EA. RPA 102 calls for an evaluation of avian predation on juvenile salmonids in the FCRPS reservoirs above Bonneville Dam. RPA 103 calls for study of predation by white pelicans on juvenile salmon in the McNary pool and tailrace. The proposed actions from these studies will be evaluated for consistency with the selected alternative for the APD program at the dams and any additional environmental compliance will be completed at that time, if necessary.

This analysis will address effects to primary and secondary predators that have been observed at the project sites, which are listed in the Table 1.2 below.

Primary avian predator species are defined as having been consistently identified at the Lower Columbia and Snake Rivers dams over the 6-year period from Fiscal Year (FY) 1997 to 2002. Secondary predators are defined as those seen occasionally on-site.

Table 1.2. List of Primary and Secondary Predators Observed at Project Sites

Primary Predators	**Secondary Predators**
California gull (*Larus californicus*)	Caspian tern (*Sterna caspia*)
Ring-billed gull (*L. delawarensis*)	Forster tern (*S. forsteri Nuttall*)
Herring gull (*L. argentatus*)	Common merganser (*Mergus merganser*)*
Double-crested cormorant (*Phalacrocorax auritus*)	American white pelican (*Pelecanus erythrorhynchos*)
	Great-blue heron (*Ardea herodias*)
	Belted kingfisher (*Ceryle alcyon*)
	Western grebe (*Aechmophorus occidentalis*)
	Bonaparte gull (*Larus Philadelphia*)

*female common mergansers were misidentified as red-breasted mergansers in Appendix G tables

1.7 Related Environmental Analyses

Below is a list of environmental analyses, prepared by the Corps and other Federal agencies, that address impacts of avian predators, predation on juvenile salmonids by birds, and managing damage caused by birds. The Corps considered these analyses when preparing this EA.

- United States Army Corps of Engineers, Bonneville Power Administration (BPA), and United States Bureau of Reclamation (USBR); *Columbia River System Operation Review EIS* (CORPS et al. 1995). The Corps, BPA, and USBR analyzed changes in Columbia River system operations and the effect of those changes on users of the system and the environment. Pertinent and current information available in the EIS, from which this EA is tiered, is incorporated by reference.

- United States Army Corps of Engineers; *Lower Snake River Juvenile Salmon Migration Feasibility Report/EIS* (CORPS et al. 2002a). The Corps issued a Final EIS analyzing improvements for juvenile salmon migration through Lower Snake River dams and reservoirs. Pertinent and current information available in the EIS, from which this EA is tiered, is incorporated by reference.

- USDI-USFWS; *Final Biological Opinion on the Effects to Listed Species from Operations of the FCRPS* (USFWS 2000). The USFWS BiOp addresses the effects of FCRPS operations on listed species and designated critical habitat identified in accordance with the ESA (16 USC 1531 et seq.), as well as Reasonable and Prudent Actions for bull trout and white sturgeon.

- Bonneville Power Administration; *EA and FONSI for the Avian Predation on Juvenile Salmonids in the Lower Columbia River Research Project* (BPA 2001). The EA analyzes the impact of piscivorous bird research activities in the Columbia River estuary.

- United States Department of Commerce (USDC)/National Oceanic and Atmospheric Administration (NOAA)/NMFS; *Final Biological Opinion on the Reinitiation of Consultation on Operation of the Federal Columbia River Power System, Including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin* (NMFS 2000b). The NMFS BiOp addresses the effects of the proposed actions on listed species and designated critical habitat, identified in accordance with the ESA (16 USC 153 et seq.), and sets forth the Reasonable and Prudent Alternative.

- USDC / NOAA /NMFS; *Final EIS on Anadromous Fish Agreements and Habitat Conservation Plans for Wells, Rocky Reach, and Rock Island Hydroelectric Projects* (NMFS 2000a). The EIS addresses fish passage requirements and mitigation measures, including predator control, at Douglas and Chelan County Public Utility District facilities.

- United States Department of Interior (USDI)/USFWS; *Draft EIS on Double-crested Cormorant Management* (USFWS 2001). The DEIS is being developed to assess various alternatives for managing increasing populations of double-crested cormorant. The need for action is based upon the correlation between increasing populations and the growing concern about associated negative impacts, thus creating a substantial management need to address those concerns. Decisions affecting cormorant management resulting from the Record of Decision and Final EIS will be incorporated into the Corps' program.

- USDA-APHIS; *Animal Damage Control (ADC) Program Final EIS* (USDA 1997, revised). The EIS analyzes the legal, administrative, biological, economic, and social considerations of wildlife damage management activities.

- USDA-APHIS-WS; *EA and FONSI for the Management of Damage Caused by Migratory Birds in the State of Washington* (USDA 2001). The EA analyzes migratory bird damage management activities in Washington State for the protection of property, agriculture, public health and safety, and natural resources.

- USDA-APHIS-WS; *EA and FONSI on Piscivorous Bird Damage Management for the Protection of Juvenile Salmonids on the Mid-Columbia River* (USDA 2003). The EA analyzes APD management activities for the protection of juvenile salmonids on the Mid-Columbia River in Washington State.

2.0 PROPOSED ACTION AND ALTERNATIVES

The Corps evaluated a range of alternatives to reduce avian predation on juvenile salmonids at the eight dams. These include:

1. No-Action (No Change) Alternative – Current Program
2. Non-Lethal Tools Only Alternative (Proposed Action)
3. Exhaust All Non-Lethal Tools First Alternative
4. No Corps Program Alternative
5. Lethal Tools Only Alternative

Any additional alternatives identified during this NEPA process will be evaluated and added if determined to be reasonable and feasible alternatives.

2.1 Alternative 1: No Action (No Change) Current Program

Alternative 1, the No Action (No Change) alternative, is used as the baseline for comparison with the other alternatives. The "No Action" alternative is a procedural NEPA requirement (40 CFR 1502.14(d)), and is a feasible and reasonable alternative that could be selected.

The "No Action" (No Change) alternative would continue the current Corps avian predation deterrent program, which attempts to reduce piscivorous bird predation on threatened and endangered juvenile salmonids at the eight dams on the Lower Columbia and Snake Rivers. At each dam, the Corps implements both static (e.g. wire exclusion systems, propane exploders, electronic harassment devices, mylar tape and flags) and active (e.g. pyrotechnics, harassment shooting, vehicle harassment, and shooting) direct control measures to reduce avian predation. The timing of damage management activities is dependent upon the out-migration of smolts and the number of piscivorous birds congregating in the forebay and tailrace areas. Implementation measures to reduce avian predation on salmonids below the Lower Snake River Dams generally begin in March and end in July. Measures may be implemented year-round at the four Lower Columbia River hydroelectric dams when juvenile salmonids are present. Non-lethal methods are preferentially used to abate bird usage of tailraces and forebay areas. When necessary under the current program, non-lethal methods are supplemented with limited lethal control to provide aversion conditioning to persistent individuals and flocks of birds.

The most appropriate, effective, and biologically sound tools are used to resolve damage caused by piscivorous birds. This approach is known as Integrated Wildlife Damage Management (IWDM). In general terms, IWDM is comprised of all the tools available to resolve a particular wildlife problem. These tools may include recommending the alteration of the birds' cultural practices, as well as habitat and behavioral modification to prevent damage. The reduction of bird damage may also require that individuals within local populations be reduced through lethal tools. The best available research is used to determine the most effective and practical tools for reducing bird damage. The magnitude, geographic extent, frequency, and duration of the problem are used to determine if action is warranted. An IWDM approach would continue to be used to reduce piscivorous bird predation on juvenile salmonids at the eight dams.

Many of these bird management techniques or tools are currently being used at Corps dams on the Lower Columbia and Snake Rivers. Non-lethal tools such as overhead wiring systems, propane cannons (Martin and Martin 1984), pyrotechnics, effigies, mylar tape and various other harassment tools are used with varied success in deterring birds. Other non-lethal tools available, but not used to date, include habitat modification, translocation, nest removal, and tactile, chemosensory, and physiological repellents. Lethal tools currently being used include shooting and euthanasia following live capture. Other lethal tools that are available under the No Action (No Change) alternative include egg addling/destruction and toxicants/avicides. All current avian deterrent techniques and tools being used comply with appropriate Federal, State, and local laws.

Evaluation of the appropriateness of each strategy is conducted. Tools are evaluated in the context of their availability (legal and administrative) and suitability based on biological, economic, and social considerations. Following this evaluation, the tools deemed to be practical are incorporated into a damage management strategy for the situation. At the dams on the Lower Columbia and Snake Rivers, monitoring and evaluation of the situation is used to devise the most practical and effective solution. If one tool or combination of tools fails to reduce piscivorous bird usage of areas where juvenile salmonids are susceptible to predation, a different strategy or a modified strategy may be implemented.

To meet the goal of reducing piscivorous bird predation on threatened and endangered juvenile salmonids, the Corps in the past has requested the assistance of APHIS-WS to provide technical and/or direct control assistance. Under the Current Program alternative, the Corps would continue to request both technical and direct control assistance from APHIS-WS. In the past, the Corps actions have been physically implemented by APHIS-WS. The Corps intends to continue to use the APHIS-WS Decision Model (Appendix B) to assess, implement and maintain an effective program to discourage avian predation. In terms of the APHIS-WS Decision Model, most damage management efforts consist of a continuous feedback loop between receiving the request, implementing a strategy, and monitoring the reaction of the birds. In addition, piscivorous bird populations and rates of smolt predation are monitored annually. This monitoring is incorporated into the decision model.

APHIS-WS obtains a depredation permit from USFWS, which authorizes take, possession and transport of migratory non-game birds (except bald or golden eagles and endangered or threatened species). Migratory birds may be hazed, without APHIS-WS assistance, and/or without a USFWS permit, provided hazing is not performed at nesting colonies or those locations where migratory birds are sitting on nests. When requested, APHIS-WS instructs Corps employees in the safe use and handling of pyrotechnic devices. Corps employees are not authorized to conduct lethal take, as the depredation permit only allows delegated take authority to APHIS-WS employees under the permitee's direct supervision.

Below is a more detailed description of the components of the No Action (No Change) alternative:

Technical Assistance:

Corps biologists request technical assistance from APHIS-WS, which includes instruction and/or information on both non-lethal and lethal tools to reduce predation by piscivorous birds. Technical Assistance is defined as advice, recommendations, information, equipment, literature, instructions, and materials to use in managing wildlife damage problems and understanding wildlife damage management principles and techniques.

Direct Control Assistance

Corps biologists request direct control assistance from APHIS-WS. Control assistance is defined as field activities conducted or supervised by APHIS-WS personnel. The Corps may request control assistance when it has determined that the problem cannot be reasonably solved by technical assistance or the professional skills of APHIS-WS personnel are required for effective problem resolution.

Non-Lethal Control Tools:

The Corps oversees the implementation of all practical and effective non-lethal tools known to reduce predation by piscivorous birds on juvenile salmonids. These non-lethal tools are used before any lethal tools are used. In an effort to reduce avian predation where smolts are most vulnerable, vast overhead wiring systems, which stretch across the tailrace areas of each dam, have been constructed and are maintained. Table 2.2 identifies the approximate coverage area of the existing exclusion systems. Strands of reflective tape (Mylar) are tied at spaced intervals to the wire to prevent bird collisions and entanglement. Propane cannons, pyrotechnics, effigies, and various other harassment tools are also used, with varied success in deterring birds. More details of these tools are described further in this EA. Table 2.1 identifies tools that are "Currently in Use" and are "Available, But Not Currently Used".

Lethal Control Tools:

Limited lethal control, where necessary, are used under the current program to supplement non-lethal tools to provide aversive conditioning to persistent individual birds. Lethal tools for reducing bird damage may include shooting (steel shot), egg addling[1]/destruction, or those methods, which are determined effective and practical,

[1] Addling refers to oiling, addling, or puncturing eggs. Oiling eggs prevents gases from diffusing through an egg's outer membranes and pores in the shell, thereby causing the embryo to die of asphyxiation (Blokpoel and Hamilton 1989, Christens and Blokpoel 1991). Addling (or shaking) involves vigorously shaking the eggs until sloshing is heard, thus destroying the embryo. Puncturing is done by pushing a thin, strong pin through the shell, which introduces bacteria. Eggs are replaced so that the bird continues to incubate rather than relaying another clutch.

and are further discussed in sections “Tools Currently in Use” and “Tools Available, But Not Currently Used”. Shooting is the only lethal tool that is currently in use. Shooting can be effective in removing birds that do not respond to non-lethal tools and enhances the effectiveness of frightening techniques and exclusion wiring systems. Shooting is conducted primarily from the shoreline, and occasionally from the dam. Birds are retrieved after shooting whenever reasonably possible.

Lethal tools are largely used under the current program for primary predators (see Table 1.2). However, very limited lethal control of western grebes, great-blue herons, and mergansers (Appendix G, Table 1) has been authorized infrequently in the past under the current program when individuals’ congregate in or below fish ladders, spillways, and outfalls, and only when non-lethal deterrents were ineffective. Lethal tools would not be used on great blue herons due to potential concern for recent reduction of great-blue heron colonies. Lethal tools would also not be used on American white pelicans as they are listed as a Washington State endangered species. While these species would not be subject to lethal control, inadvertent harassment may occur in locations where primary predators (see Table 1.2) feed on smolt. Lethal take of other avian species, such as secondary predators (identified in Table 1.2), would not be allowed for the purpose of juvenile fish protection.

Access to Research and Development:

The Corps adjusts its ADP program using information developed by the National Wildlife Research Center (NWRC) and other relevant scientific studies. The NWRC functions as the research arm of APHIS-WS by providing scientific information for the development of biologically sound tools for wildlife damage management. The NWRC is active in the development of new and improved wildlife damage management tools, and as new tools are developed, can be incorporated into the current program. NWRC/WS scientists work closely with wildlife managers, researchers, field specialists and others to develop and evaluate wildlife damage management techniques. For example, NWRC/WS research has been instrumental in the development, identification, and/or testing of:

1) Disturbance techniques to reduce nesting or feeding by gulls;
2) Food-grade oils to reduce hatchability of gull eggs;
3) Diet analysis and food habits of piscivorous birds;
4) Efficacy of non-lethal and lethal control at dams, hatcheries, roosts, and elsewhere; and
5) Direct predation by piscivorous birds

Ongoing and future piscivorous bird research conducted throughout the Columbia River basin is to be incorporated in the IWDM approach (e.g. Steuber et al. 1995, York et al. 2000, Collis et al. 2001, Searing et al 2002, Demarchi et al. 2003).

Table 2.1 below lists the tools that are available under the No-Action (Current Program) alternative for reducing avian predation of juvenile salmonids. The table is divided into two sections: tools currently in use and tools available, but not currently used. The following text will describe these tools. Further discussion of these types of tools is found in Jones et al. (1996, 1997, 1998, 1999), the USDA-APHIS ADC Programmatic EIS (1997, revised) and the USDA-APHIS Mid-Columbia Piscivorous Bird EA (2003).

Table 2.1. Avian Predation Deterrent Tools

Tools Currently In Use	Tools Available, But Not Currently Used
Visual Deterrents	Tactile Repellents
Auditory Deterrents	Chemosensory and Physiologic Repellents
Exclusion	Translocation
Shooting	Contraceptives
Habitat modification	Egg addling
	Avicides

Tools Currently in Use:

To be effective, repellents/deterrents and other aversive strategies typically depend on irritation (pain), conditioning, or fear, and none is universally successful (Conover 1982). The use of a combination of repellents simultaneously is recommended, but does not always ensure successful deterrence (Bradley 1980). For birds, repellents can be visual, auditory, tactile, chemosensory, or physiologic. Of these five, visual and auditory deterrents are most practical and have been implemented at the dams.

Visual Deterrents

Visual deterrents scare or startle birds, causing them to leave the area. Examples of visual scare devices include balloons, kites, effigies, plastic flagging, and Mylar streamers. Functionally, visual repellents cause startle responses, as do aposematic colors (colors that are conspicuous and serve to warn such as orange, red, or silver) and cues associated with predators (e.g., hawk silhouettes, eyespots, raptor models). APHIS-WS has used a variety of visual devices, such as those mentioned above, with varying success. The startle responses (i.e., effectiveness) eventually diminish (often within days or a few weeks) as a function of several variables, including weather conditions, bird numbers, and the availability of nearby unprotected foods (Draulans and van Vessem 1985; Feare et al. 1986; Draulans 1987; Mason and Clark 1995).

Effigies are more practical at hatcheries than dams, where they have been employed with limited success (Cummings et al. 1986; Andelt et al. 1997). The use of gull wings to simulate dead floating gulls has been used to protect city reservoirs from loafing gulls and resultant nutrient loading (SWD 1996). In general, effigies are most effective when they are used to protect a small area, are moved frequently, alternated with other tools, and are well maintained.

A variety of light-emitting devices can be used to confuse, frighten, temporarily blind, and interfere with the activities of nocturnal predators such as the heron. Light-emitting devices left on continuously would not be practical and the majority of birds would quickly become accustomed to them. A radar-activated hazing system that incorporated acoustic alarm calls, pyrotechnics, and chemical repellents to deter waterfowl from contaminated ponds has been evaluated with positive short-term results. Low to moderately powered lasers have been tested as a non-lethal hazing device on various species of birds and show promising results as an effective tool for dispersing nocturnal piscivorous birds from hatchery facilities. Lights are not effective for reducing avian predation at dams and may instead attract predators. In one example, night releases of smolts (most smolts passed through the bypass system at night) into the tailrace area showed an approximate 50% increase in mortality over other releases (Sims and Johnsen 1977). Since the tailrace deck near the outfalls were well lighted, it was believed to have aided predators in capturing their prey. Jones et al. (1997) also observed gulls feeding at night in the forebay of dams that were illuminated by floodlights.

Mylar tape has been used with mixed results to reduce damage to fruit crops, sunflowers, millet, maize, and sorghum in the United States, Bangladesh, Philippines, and India (Bruggers et al. 1986; Dolbeer et al. 1986; Tobin et al. 1988). Mylar tape and other objects with shiny surfaces, by themselves, are ineffective for deterring piscivorous birds from dams. These objects are tied down, becoming a permanent feature for birds that habituate quickly. Success with this tool is often minimal or short-term, and completely ineffective at night. Mylar tape is used to enhance the visibility of the overhead wire exclusion system to birds, thereby reducing their risk of entanglement.

Avian hydrocannons have been installed at the juvenile bypass outfall at all of the Corps dams except The Dalles and Lower Granite. Hydrocannon systems consist of one or two 150-gpm irrigation-type impulse sprinklers powered by a submersible 25-hp three-stage electric turbine pump. The sprinklers are set to sweep a 50-yard radius with a 90-degree arc, centering on the juvenile bypass discharge plume (Jones et al. 1998). They typically run either 24 hours or dusk to dawn, and are operated during the juvenile fish season, although they may be operated at other times when juvenile fish predation is observed. Under ideal conditions, the avian hydrocannon covers a small percentage of most juvenile bypass outfall plumes, and gulls have occasionally been observed within the spray (Jones et al. 1998).

Auditory Deterrents

Birds will become accustomed to noises that are frequent, occur at regular intervals and intensities, and are broadcast in one location for long periods of time (Andelt and Hopper 1995; Curtis et al. 1996). Bomford and O'Brien (1990) evaluated the effectiveness of a variety of noisemakers on birds and mammals and concluded that their application is almost entirely limited to short-term control. However best effects are obtained when:

- Sound is presented at random intervals,
- A range of different sounds are used,
- The sound source is moved frequently,
- Sounds are supported by additional methods, such as distress calls or visual devices, and
- Sounds are reinforced by real danger, such as shooting.

Distress calls, automatic exploders, and pyrotechnic devices have been used with varying success to deter piscivorous birds from dams. The disadvantage of auditory repellents is the limited area of their effectiveness, particularly at dams, due to the width of the river and high levels of background noise. As with other techniques, noise-making devices generally are more effective when used in combination with other tools.

Distress and alarm calls have been relatively ineffective when applied as a hazing device. Alarm sounds may be superior to distress sounds for dispersing or repelling birds, assuming that valid alarm sounds exist for the species in question. At dams, the apparent ineffectiveness of these calls may be due to the overwhelming level of noise generated by water rushing under spill gates and elsewhere. An audio distress unit is in use at Little Goose.

Propane cannons have been commonly used for the control of bird depredation and nuisance problems. Some models of propane cannons vary the timing and number of blasts that are emitted and physically rotate to alter the direction of the blasts. This device is effective only when augmented with other tools, including limited lethal control, under the current program to reinforce the scaring property associated with each blast of the exploder (Slater 1980). Jones et al. (1996) found propane cannons to be only momentarily effective below hydroelectric dams, if at all, and on many occasions, birds showed no response. Great-blue herons have been observed using operational propane cannons as perches. Propane cannons are used at all of the dams, except Lower Monumental and Lower Granite.

Pyrotechnics are the primary hazing tool used to deter piscivorous birds at dams. Unlike distress calls or propane cannons, birds are less likely to habituate to pyrotechnics, which are used less frequently and only when birds are in the immediate vicinity. Various types of pyrotechnics used include: cracker shells, whistle bombs, screamers, screamer rockets, bangers, and fuse rope firecrackers. At aquaculture facilities in the southern United States, dispersal of night roosts was the most effective, non-lethal technique to temporarily deter cormorants. Although pyrotechnics are the most practical and efficient non-lethal noise-making device available, they are only marginally effective in deterring piscivorous birds from feeding at dams where long distances are common. Birds easily fly out-of-range and continue feeding. Jones (et al. 1997) also noted the limited range of pyrotechnics to disperse feeding gulls at The Dalles Dam. Birds also relocate to adjacent landowners' property. With landowner permission and proper agreements in place, hazing of avian predators, which are causing damage, may continue.

Ultrasonic devices have been offered as deterrents to roosting and loafing birds. These devices have no demonstrated utility, probably because birds are physiologically incapable of detecting ultrasound (Mason and Clark 1995).

Exclusion

In 1936, the USDA issued a leaflet with instructions and diagrams showing how to exclude birds from reservoirs and small fishponds. Since then, various types of exclusionary devices, from netting to stainless steel cable have been tested on various avian species to determine the optimal design. Exclusionary devices were developed for use at hatchery facilities. These devices were installed below hydroelectric dams on the Columbia and Snake Rivers. Table 2-2 provides a list of non-lethal equipment installed at the dams, and proposed improvements.

On the Lower Columbia and Snake Rivers, vast overhead wiring exclusion systems over the tailrace at each dam have been constructed and are actively maintained. These wiring systems consist of 3/64" stainless steel cable stretched from the one bank of the river to the other or from the shore to the dam, depending on the availability of suitable anchor points. The average exclusion system at hydroelectric dams is comprised of 21 to 30 wires spaced at 25 to 50 foot intervals, with wires stretching anywhere from 500 to 1,800 feet. Reflective mylar strands are installed on all the exclusion systems. The Bonneville strands are replaced annually (March, 2003).

Table 2-2. Non-Lethal Equipment Installed and Proposed at Dams

Location	Type of Non-Lethal Equipment	Proposed Improvements
Bonneville	Exclusion systems with mylar flagging, 2 hydrocannons; propane cannon	None
The Dalles	Exclusion system with mylar flagging; propane cannon	None
John Day	Exclusion systems with mylar flagging; propane cannon	None
McNary	Exclusion system with mylar flagging; 1 hydrocannon; propane cannon; and nixalite	One additional hydrocannon
Ice Harbor	Exclusion system with mylar flagging; 1 hydrocannon; propane cannon; and nixalite	Nixalite on lights
Lower Monumental	Exclusion system with mylar flagging; 1 hydrocannon; and nixalite	Nixalite on lights, mooring dolphin and buoys
Little Goose	Exclusion system with mylar flagging; 1 hydrocannon; propane cannon; streamers in water; audio distress signals; and nixalite	One additional hydrocannon; Nixalite on lights and buoys
Lower Granite	Exclusion system with mylar flagging; and nixalite	One hydrocannon; Nixalite on lights and buoys.

Strong winds have deteriorated the flagging at other dams. Generally, flags are replaced when replacement wires are installed. The wiring system at John Day was expanded in March of 2003 to include coverage for the juvenile bypass discharge area. The expansion eliminates the need for a hydrocannon at that location, unless the wires become damaged. See Appendix A for project exclusion systems and Table 2.3 below for additional details. Jones et al. (1996, 1997, 1998, 1999) discuss and illustrate the placement and effectiveness of an overhead wire exclusion system. In general, wire grids have been one of the most effective deterrents available, particularly for gulls, when used in combination with hazing and limited lethal control (under the current program).

Another form of exclusion is the use of Nixalite, which is the brand name for a device used to prevent birds landing on resting and loafing locations. Also known as porcupine wire, it is used in locations such as light standards, marker buoys, floating barrier logs or other prime predator bird resting locations. The objective is to cause them to rest further from the dams and increase their travel time to and from feeding

Table 2.3. Dam Exclusion Systems Existing and Proposed Coverage

Location	Existing Area (acres)	Proposed Area increase (acres)	Purpose of Improvement
Bonneville Main Dam	12	Same	-
Bonneville Powerhouse 1	2.3	Same	-
Bonneville Powerhouse 2	4.4	Same	-
The Dalles Powerhouse	18	Same	-
The Dalles Spillway	63	Same	-
John Day	90	Same	-
McNary	9.7	24	Spillway tailrace area protection
Ice Harbor	28.0	2.9	Tailrace area protection
Lower Monumental	4.1	9.3	Spillway tailrace area protection
Little Goose	3	9.7	Spillway tailrace area protection
Lower Granite	23.4	Same	-

sites near the dams. By excluding prime landing sites, avian predation near the dams becomes less efficient and requires more energy for the birds than alternate sites further from the dam. Porcupine wire has been used in a limited capacity at some of the dams and its use as a non-lethal deterrent is expected to continue and increase.

Shooting:

Under the current program, shooting is more effective as a dispersal technique than as a way to reduce bird densities when large numbers of birds are present. Shooting therefore also functions as a non-lethal tool (auditory repellant) for the birds that are not killed. Normally, shooting is conducted with shotguns. Shooting is an individual-specific tool and is normally used to remove a single bird and frighten away the other birds in a flock. This procedure reinforces the effectiveness of pyrotechnics, propane exploders, and other exclusionary devices. At hydroelectric dams on the Lower Columbia and Snake Rivers, lethal control alone under the current program is not effective in reducing avian predation because target birds must be in close proximity to the shore. As with pyrotechnics, flocks that are within range and are shot at often move further offshore and continue feeding.

Shooting is selective for target species but can be relatively labor intensive (USDA 1997, revised). Shooting with shotguns, air rifles, or rim and center-fire rifles is sometimes used to manage bird damage problems when lethal tools are determined to be appropriate. The birds are killed as quickly and humanely as possible. Firearms are used in accordance with applicable laws, regulations, and safety precautions.

To ensure safe use and awareness regarding the use of firearms, employees, who handle firearms and any other lethal control measures, must complete an approved firearms safety and use training course annually.

Tools Available But Not Currently Used:

Repellents:

Under conditions of normal use, repellents act directly on the target species but, importantly, they are non-lethal. Of the 43 products registered as bird damage control chemicals in the United, States, only seven are repellents (Mason and Clark 1995). Within this small group of products, capsaicin, denatonium saccharide, and napthalene are the active ingredients in three products. The other four contain the active polybutene, which is the only chemical that has demonstrated utility.

Tactile Repellents

Tactile chemicals are derived from petroleum or coal and are usually used to discourage birds from alighting or roosting on structures and trees. One such chemical, polybutene, is a chemically inert wax emulsion and has excellent moisture and barrier qualities. It can be mixed with water to form an emulsion, and is applied to hard surfaces. It does not dissolve in water, and would float on water when not suspended. Many grades have FDA clearance. The material can be applied to beams, posts, and other structural materials in order to deter gulls and other birds from landing by modifying the perching surface so that it becomes slippery or sticky, confusing a bird's tactile senses or physically preventing perching (Schafer 1991). While effective, polybutene-based repellents are thermally unstable, and melting repellent can deface structures to which it is applied (Mason and Clark 1995). Although polybutene is not considered to be directly toxic, secondary effects are death by exposure or starvation when excessive feather contamination interferes with thermoregulatory ability or flight (Schafer 1991).

Chemosensory and Physiologic Repellents

These substances are effective either because they are painful or cause sickness (Mason and Clark 1995). Although a product for this tool is not currently available for implementation, research is being conducted on methyl anthranilate (MA), a product that has shown some efficacy in repelling gulls from shallow pools of water used for loafing and watering, but has been shown to have no effect on the time herons spent handling fish. MA is not fundamentally toxic to mammals or birds, but may be moderately toxic to fish. The potential use of chemical repellents in deterring feeding birds from dam and hatchery facilities is limited under current technology and none are registered with the Environmental Protection Agency (EPA) or Food and Drug Administration (FDA) for this use. If these types of repellents were used in the future, additional analysis and coordination, such as for the Clean Water Act and the Endangered Species Act, would occur.

Alternative Food Plots

An alternative food plot is providing an alternative source of food in alternative location. The use of alternative food plots and their potential effectiveness to dissuade avian predation below hydroelectric dams has not been demonstrated at this time.

Habitat Modification:

The Basinwide Salmon Recovery Strategy (Federal Caucus 2000) calls for modifying abundance and distribution of predators by altering their habitat. Habitat modification is an integral part of wildlife damage management. The type, quality, and quantity of habitat are directly related to the wildlife that is produced. Most off-site habitat management to reduce piscivorous bird usage directly on-site at dams is not practical. The modification of habitat at hydroelectric dams that included the re-design or removal of dams or hatcheries has been considered in multiple EIS's (Corps et al. 1995; NMFS 2000b; BPA 2001; Corps et al. 2002a).

Habitat modification of nesting colonies where birds have been shown to use hydroelectric dams as a feeding area is being considered. Habitat modification is the best long-term, most ecologically sound and socially acceptable solution for reducing nesting gull populations (Blokpoel and Tessier 1986) and has been an effective tool for reducing nesting Caspian terns on Rice Island in the Columbia River estuary (Collis et al. 2001). A 70m x 70m visual barrier made of woven black polypropylene fabric (silt fencing) was tested to discourage gull nesting on Upper Nelson Island, located on the Columbia River near the city of Richland, WA. Although this tool was labor intensive (147 person hours over 3 days) and somewhat costly ($1.81/m), the zone with fencing had 84% fewer nests than the control zone.

Caspian tern habitat modification work has been performed on Rice Island, downstream of Bonneville Dam, but not under the Corps APD Program. As the tern colony continues to increase in the estuary, it was successfully relocated from Rice Island to East Sand Island, where the birds now feed on more ocean-type fish and less on salmonids. See Appendix A Plate 2 for island locations. This effort is discussed in further detail in Chapter 6 Cumulative Effects.

Crescent Island is Federal property, administered by the Corps and currently leased to USFWS. The island was created from dredge spoils and is located on the Columbia River, upstream of McNary Dam, between its confluences with the Walla Walla and Snake Rivers. The number of Caspian terns nesting and residing at Crescent Island has increased in the past few years. Any habitat modification efforts proposed would be evaluated and separate NEPA documentation would be prepared, as necessary.

Translocation:

The trapping and translocation of piscivorous birds is generally not a practical option. Birds typically have a better homing instinct than mammals and because of this, translocation is not commonly used to solve bird problems (Conover 2001). However, the natural translocation of piscivorous bird colonies through habitat modification may be an acceptable non-lethal alternative.

Contraceptives:

Contraceptives have not proven to be an effective tool for reducing damage, and there are no contraceptive drugs registered with the FDA for piscivorous bird use. The Corps will continue to evaluate research, but has no plans to use contraceptive tools at this time.

Egg addling:

Egg addling/destruction is the practice of destroying the embryo prior to hatching. Egg addling is conducted by vigorously shaking an egg numerous times, which causes detachment of the embryo from the egg sac. Egg destruction can be accomplished in several different ways, but the most commonly used tools are manually gathering eggs and breaking them, or by oiling or spraying the eggs with food grade oil which prevents gas passage through the shell and prevents the embryo from obtaining oxygen. Although egg addling or destruction has not commonly been used for the protection of juvenile salmonids, it could be a useful damage management tool and has shown to be effective at reducing egg hatchability (USDA 2001, 2003). This is not a tool that the Corps would expect to use, as few or no nesting areas are located on-site at the dams.

Avicides:

Avicides are regulated and administered by the EPA and the Washington and Oregon Departments of Agriculture. DRC-1339 is a slow acting avicide that is currently registered with the EPA for reducing damage by California, ring-billed, and herring gull species. No other avicides are registered for piscivorous bird species. DRC-1339 is highly toxic to sensitive species, such as gulls, blackbirds, pigeons, and crows, but only slightly toxic to non-sensitive birds, raptors and mammals. Numerous studies show that DRC-1339 poses minimal risk of primary poisoning to non-target and ESA-listed species. Aquatic and invertebrate toxicity is also low. The half-life of DRC-1339 is about 25 hours and degradation occurs rapidly in water.

During the breeding season, sensitive target species may be controlled in their colonies for the purpose of protecting other colonially nesting species and to reduce populations of target gulls which damage property or crops in other areas. At any time of the year, these species may be controlled at their feeding sites at airports, industrial areas, landfills, or other non-crop areas throughout the year. Personnel using chemical methods require certification as pesticide applicators by the Department of Agriculture in Washington and Oregon States (WSDA and OSDA) and are required to adhere to all certification requirements set forth in the Federal Insecticide, Fungicide, and Rodentcide Act (FIFRA). Currently, avicides are not applicable, practical, or effective, and are not a foreseeable action, but is described in this section for information.

2.2 Alternative 2: Non-Lethal Tools Only

Alternative 2 is the Current Program Alternative without the use of lethal direct control. Both technical assistance and direct control would be provided in the context of a modified IWDM approach. The Corps would only use non-lethal strategies to resolve piscivorous bird damage situations. Lethal control could be used, under certain circumstances by other permitted agencies. The Corps would still use the APHIS-WS Decision Model to determine the best approach for resolving wildlife damage, but lethal tools would be administratively screened from consideration in formulating control strategies. Examples of non-lethal tools (exclusion systems, hydrocannons, etc.) for controlling damage caused by various bird species are described in Appendix J of the USDA-APHIS ADC Programmatic EIS (1997, revised), and in Section 2.1 of this EA. The use of non-lethal tools could result in local population increases and could result in impacts to adjacent landowners.

2.3 Alternative 3: Exhaust All Non-Lethal Tools First

Alternative 3 differs from the Current Program in that the Current Program recognizes non-lethal tools as an important dimension of IWDM, gives them first consideration in the formulation of each control strategy, and recommends or uses them when practical and effective before recommending or using lethal tools. In contrast, Alternative 3 requires that all non-lethal tools be implemented, regardless of practicality, effectiveness, or biological, social, and economic consequences, before any lethal tools are recommended or used. Under Alternative 3, any non-lethal tool that may reduce avian predation would be used before any lethal tools could be implemented. The delayed use of non-lethal tools could result in local population increases and could result in impacts to adjacent landowners.

2.4 Alternative 4: No Corps Program

Alternative 4 would consist of the Corps taking no actions to reduce piscivorous bird damage at its Lower Columbia and Snake River dams. It is assumed that avian predator presence and activity would increase in areas near the dams where juvenile salmonids are susceptible. Consequently avian predation on juvenile salmonids would likely increase. The NMFS 2000 BiOp RPA action 101 would not be effectively implemented to minimize and mitigate impacts to Federally-listed salmonids to the 'maximum extent practicable' as required by the ESA (NMFS 2000b). The Corps' compliance with RPA 101 would be in question, if not determined non-compliant. This alternative would not meet the program's purpose and need.

2.5. Alternative 5: Lethal Tools Only

Alternative 5 would use only lethal methods to deter piscivorous birds from preying on juvenile salmonids and would not use a damage management system. It would not employ non-lethal methods that have been proven effective at deterring avian predation, which would include removing existing exclusionary systems from all of the dams. This alternative is considered environmentally unacceptable because its sole means of discouraging avian predation would be through lethal take. The alternative would meet the program's purpose and need, but would fail to manage damage to target species. Wildlife agencies have stated that lethal tools are only to be used as a supplement to non-lethal tools. Increasing the take level of target species could reduce local populations and decrease viewing opportunities in adjacent areas. This alternative is is considered environmentally unacceptable.

2.6. Screening of Alternatives

Alternatives that are not viable alternatives will be excluded from further evaluation. The provided discussion below identifies the rationale used for screening and excluding these alternatives.

Alternative 4: No Corps Program
This alternative is eliminated because it would not meet the program's purpose and need.

Alternative 5: Lethal Tools Only
This alternative is eliminated because it does not constructively manage damage to target species.

2.7. Alternatives Carried Forward

The following alternatives were not screened out, and will be carried forward for further analysis and evaluation in Chapter 4.

Alternative 1: No-Action (No Change) Current Program
Alternative 2: Non-Lethal Tools Only
Alternative 3: Exhaust All Non-Lethal Tools First

3.0 EXISTING ENVIRONMENT

3.0.1 Resources with Minimal or No Impact

The actions discussed in this EA involve minimal ground disturbance or construction. Therefore, the following resource values are either not affected, or are expected to be minimally affected by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetland, air quality, prime and unique farmlands, vegetation, aesthetics/visual quality, transportation, cultural/historic resources and/or utilities. Except for avian predators and anadromous fish, the proposed APD program does not affect other aquatic and wildlife resources. These resources will not be discussed further.

3.1 Recreation

Recreational viewing of wildlife is available to the public from the dams. Most visitors to the dams are interested in viewing aquatic species, such as salmon and steelhead. Recreational activities are also conducted on the reservoirs behind the dams and on the river sections downstream of the dams. Areas immediately upstream and downstream of the dams are restricted areas from public use due to concerns for safety. The APD program is primarily performed in these restricted areas. However, the blasts from shotguns or propane cannons can produce noise that may be heard outside of the restricted areas which visitors may find distracting or disturbing.

3.2 Aquatic and Wildlife Resources

The following section discusses existing aquatic and wildlife resources that exist at the project sites. Birds, fish, mammals, trees and plants are found in abundance within and adjacent to the project area. The proposed APD program does not affect many of these resources and therefore, this section will focus on describing only those resources that are primarily affected, specifically avian predators and anadromous fish. The Biological Assessment (BA) (Appendix C) addresses species listed as threatened or endangered under ESA that reside in proximity to the Corps dams,. The BA determines the program's expected level of affect on those species.

3.2.1 Brief history of juvenile salmonid predation and mitigation

Hydroelectric development changed the Columbia River basin from mostly free-flowing rivers beginning in 1933 to a series of dams and impoundments by 1975. The reservoirs that formed behind some dams created islands that were ideal for piscivorous bird colonization (NMFS 2000b). Enhancement measures to offset dam-related mortality of fish included increased numbers of smolts released from hatcheries, spillway deflectors to reduce total dissolved gas (TDG) supersaturation, juvenile fish bypasses at dams, transportation of smolts around dams, supplemental river flows to minimize delay for smolts passing through reservoirs, and spilling water to bypass juvenile fish. Guidance systems such as surface bypass and collection structures, submersible screens, and behavioral guidance structures have helped direct smolts through the upper part of the water column, where they prefer to swim, thus avoiding the turbines in the dam.

The major causes of mortality of migrating juvenile salmonids in the Columbia River basin have been identified as passage through the turbines, TDG supersaturated water due to spill, migration delays, fish disease, and predation by birds and fishes in the reservoir, forebay and tailrace; (CORPS et al. 1995; Federal Caucus 2000; NMFS 2000b; BPA 2001; NMFS 2002; CORPS et al. 2002a). Piscivorous birds often feed in areas of high fish density and attract other birds to feeding areas. In the Columbia River basin, piscivorous birds aggregate below hydroelectric dams in spring to feed on emigrating juvenile salmonids (Jones et al. 1996, 1997, 1998, 1999; NMFS 2000b). Juvenile salmonids commonly experience a number of stressful events or conditions during their seaward migration. Most of these events occur serially and can have cumulative effects, as when juvenile salmon pass through dams and enter predator-inhabited tailrace areas (Mesa 1994). Because dam passage is a stressful event (Specker and Schreck 1980; Matthews et al. 1986; Maule et al. 1988; Abernethy et al. 2001), there is concern that juvenile salmonids passing through dams would not be able to cope with subsequent stressors, such as predators (Mesa 1994).

The Basinwide Salmon Recovery Strategy (Federal Caucus 2000) outlines measures to identify and address mortality factors in the mainstem reservoirs, which are a significant component of the overall goal to increase the survival of juvenile salmonids. Actions include hydropower operations, predator management, and habitat modifications that may reduce the effect of predators on juvenile salmonids. The Federal Caucus (2000) states that research and evaluation of passage survival through dams and reservoirs will continue, with emphasis on the effect of passage delay in the forebay and tailrace at dams and the relationship between dam passage and reservoir mortality. Measures planned to improve juvenile survival include:

- Increased flow augmentation for summer migrants, particularly in the low water years,
- Management of reservoir and run-of-river projects to reduce extreme water level fluctuations,
- Management of predator populations (fish, birds, and mammals), and
- Implement passage measures which move fish quickly through the forebay and tailrace of dams

The implementation of APD management activities to reduce predation on ESA-listed juvenile salmonids is but one of many mitigative measures. Given the state of decline being faced by many salmon and steelhead species, APD management could contribute to recovery efforts along with a suite of other management actions (Federal Caucus 2000).

3.2.2 Predation at hydroelectric dams

The area immediately below dams where smolts are most vulnerable to predation is called the tailrace, which extends 1,000 feet downstream from the base of the dam. Avian predation in the tailrace of each dam should be reduced in order to allow time for disoriented smolts to recover from the physiological effects of dam passage. The physiological condition of migrating juvenile salmonids may be altered by dam passage or transportation, increasing their vulnerability to avian predators (Maule et al. 1988; Federal Caucus 2000; NMFS 2000b; NMFS 2002).

Juvenile salmonids may experience various levels of gas bubble trauma (GBT) due to TDG supersaturated water as they enter the tailrace of the dam. When air is dissolved in water at pressures exceeding one atmosphere, more gas is driven into solution than is normal for most surface waters; such waters are supersaturated. Studies have been conducted documenting the level of GBT experienced by anadromous fish during dam passage and its possible effect on predator avoidance (Mesa 1994; Mesa et al. 2000; Abernethy et al. 2001). When aquatic animals, especially fish, are exposed to water containing gas levels over 110%, they may be injured or killed by air emboli collecting in vital organs. In lab tests, prey subjected to multiple agitations (simulating conditions encountered by smolts during dam passage) were lethargic, frequently disoriented, and occasionally injured, but they never died during or immediately after the stressor treatments; data revealed that smolts stressed by agitation were eaten (by northern pikeminnow) in significantly greater numbers than control fish. Abernethy et al. (2001) noted that although test fish fully recovered from simulated dam-passage tests, temporarily stunned fish may be more susceptible to predators in the tailwaters of a hydroelectric dam. Smolts became progressively more alert and active with passing time, usually within 3 hours after the final stress.

3.2.3 Juvenile salmonid protection

Anadromous salmonid ESUs in the Lower Columbia and Snake River basins have been listed under the ESA (NMFS 2000b). The risk of extinction for these ESUs has prompted a major allocation of resources toward restoring freshwater *habitats*, enhancing passage though the *hydrosystem*, restricting *harvest*, and improving *hatchery* production, also known as the *all-Hs* of salmon restoration (Federal Caucus 2000). Increasing attention has focused on losses of emigrating smolts to avian predators as one of many measures to enhance passage through the hydrosystem (Jones et al. 1996, 1997; 1998; 1999; Collis et al. 2001).

Factors affecting the intensity of this predation include life history characteristics of the migrating stocks, concentration of juveniles at dams, stunned or disoriented juveniles at turbine and spillway discharges, limnological changes after impoundment, and changes in the predator complex. The relative effect of different vertebrate predators is rarely quantified, which has led to continued disagreement about the extent of damage attributable to birds or mammals.

NMFS (2000b) has identified gulls as significant predators of juvenile salmonids. Gulls are the primary avian predators at Corps hydroelectric dams (Jones et al. 1997, 1998, 1999; NMFS 2000b) and take a minimum of tens of thousands of migrating smolts every year (Jones et al. 1998). The impact of gull predation below a single dam may seem insignificant, but the combined effect of predation on salmon survival at each of the nine Columbia River dams and four Snake River dams is substantial, especially in combination with other negative impacts such as turbines, nitrogen supersaturation, migration delays, and disease.

Avian deterrent wires, the primary non-lethal damage management tool used below each hydroelectric dam, have been proven to reduce the accessibility of juvenile salmonids to avian predators (Jones et al. 1996, 1997, 1998, and 1999), but only when used in combination with limited lethal control (see Section 2.1). The effectiveness of passive exclusionary devices below dams in Columbia River Basin would be severely reduced without limited lethal removal of individual birds. Collis et al. (2002a) observed that the current practice of protecting smolts from gull predation in areas where they have been shown to be vulnerable (i.e. dams) is likely to be the most effective tool to minimize the impacts of predation on survival of juvenile salmonids.

Searing et al. (2002) assessed the piscivorous bird predation from Rock Island Dam through Hanford Reach. The results indicated that the combined predation on juvenile salmonids by gulls, grebes, cormorants, and mergansers had the potential to comprise the vast majority of avian-caused smolt mortality. Smolts were consumed by gulls during the study period, leading to a mortality rate of 1 to 2% of ESA-listed and non-listed juvenile salmonids. Observations made by Searing near Wanapum and Priest Rapids Dams suggested that shooting gulls and other avian predators was an effective means of reducing the number of birds feeding in the tailrace. On days when APHIS-WS was not working, gulls were commonly seen foraging on smolts in the tailraces (Searing et al. 2002).

Demachi et al. (2003) assessed the amount of avian predation on migrating smolts during various spill configurations and the behavior of the birds consuming smolts at Wanapum and Priest Rapids Dams on the Mid-Columbia River. The study's objective was to determine practical and effective bird damage management strategies that could be used to reduce avian predation rates. Observations indicated that 92% of the fish taken by gulls were alive; however, while some of the fish may have died anyway or were in the process of dying, a considerable portion were likely healthy prior to being taken. It was also concluded that spill type alone was not an effective means of mitigating avian predation; whereas the APHIS-WS implementation of an integrated program effectively reduced bird abundance, and predation on smolts (Demarchi et al. 2003).

Columbia Bird Research (2002, Weekly Report) observed piscivorous birds to be 2-3 times higher at McNary Dam on the Lower Columbia River when APHIS-WS personnel were not conducting direct control activities. Similarly, the number of foraging attempts by gulls in the tailraces was roughly 6 times higher without direct control activities (42.2 attempts per hour), as compared to with-direct control activities (7.7 attempts per hour). However, the success rate of the gulls, with and without APHIS activity, did not vary and was roughly 50% (i.e. even when there were fewer birds and less competition, their success rate did not improve) (Columbia Bird Research 2002).

The exact number of juvenile salmonids consumed below dams is difficult to determine, but minimum estimations of piscivorous predation rates have been estimated based on PIT-tag data (passive integrated transponder) and bioenergetics models. According to Murphy (2002), the rates of piscivorous bird predation are considered minimum estimations because:

(1) PIT-tags are consumed and defecated or regurgitated by piscivorous birds en route to or away from the colony sites that are surveyed each year and are never located;
(2) Tags may be buried too deeply in the sand to be detected by electronic equipment, or may be carried away by water and wind;
(3) Tags may not be detected by portable PIT-tag readers when they are in close proximity to each other and;
(4) Some PIT-tags that become damaged can no longer be read by electronic equipment.

Natural selection governs the time of production in such a way that it takes place when the food supply for the young is most plentiful. Steelhead and salmon smolt migration begins in early April from the upper portions of the Columbia and Snake Rivers. The timing of this migration corresponds with the initiation of piscivorous bird nesting throughout the Columbia River basin (Collis et al. 2001).

Although no one has defined the exact number of ESA-listed anadromous fish being consumed by avian predators on the Lower Columbia and Snake Rivers, it has been demonstrated that a certain percent are consumed below each hydroelectric dam. Conover (2001) states that there is no word or phrase to describe species whose current population exceeds historical levels due to human caused environmental changes; hence these species are referred to as being “anthropogenic abundant.” Many environmental changes caused by humans either simply cannot be reversed or the cost of doing so would be too high. In these cases, other approaches are needed to reduce the environmental harm caused by anthropogenic abundant species, and one such approach is to reduce populations of those species when they threaten an endangered species or pose a danger to the environment (Conover 2001). Modes of managing animal damage include a variety of ecological approaches that apply the same population ecology principles as those to enhance positively valued wildlife. No single activity is sufficient to recover and rebuild fish and wildlife species in the Columbia River basin, but rather the successful protection, mitigation, and recovery effort must involve a broad range of strategies, including habitat protection and improvement, hydrosystem reform, artificial production, and harvest management (NPPC 2000).

3.2.4 Predator Control Data

The Corps, NMFS, USFWS, NPPC, and others have identified that predator control is likely to increase smolt survival through each project on the Lower Columbia and Snake Rivers.

Gulls

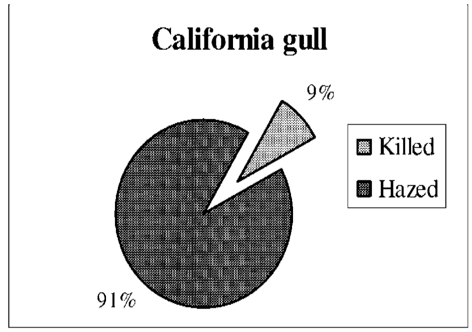


Figure 3.1: Percentage of California gulls killed vs. hazed at all CORPS dams on the Lower Columbia and Lower Snake Rivers.

California gull:
During the 5-year period (FY1997 to FY2001), 16, 721 California gulls were hazed and 1,622 were lethally removed at all Corps projects on the Lower Columbia and Snake Rivers. The average per year was 3,344 and 324, respectively (USDA Management Information System (MIS) 1996-2001). This represents a total hazed to killed ratio of 10.3 to 1. Hazing and kill data for the year FY2002 was 16,119 and 94, respectively (see Appendix G). USDA (2001) also discusses the impacts of wildlife damage management activities on this species in Washington. Figure 3.1 shows the percentage of birds killed vs. hazed. The increase in take in FY2001 is most likely attributed to increased colony populations and increased usage of the tailrace areas. The most hazing occurred in FY2002.

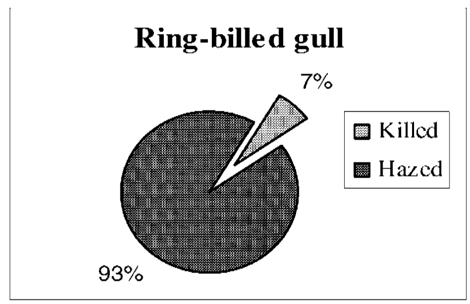


Figure 3.2: Percentage of ring-billed gulls killed vs. hazed at all Corps dams on the Lower Columbia and Lower Snake Rivers.

Ring-billed gull:
During the 5-year period (1997 to 2001), 66,852 ring-billed gulls were hazed and 4,947 were lethally removed at all Corps projects on the Lower Columbia and Snake Rivers. The average per year was 13,370 and 989, respectively (USDA MIS 1996-2001). This represents a total hazed to killed ratio of 13.5 to 1. Hazing and kill data for the year 2002 was 29,488 and 530, respectively (see Appendix G). USDA (2001) also discusses the impacts of wildlife damage management activities on this species in Washington. Figure 3.2 shows the percentage of birds killed vs. hazed. The lethal take peaked in 1999 and decreased during each of the following years. The most hazing occurred in 2002.

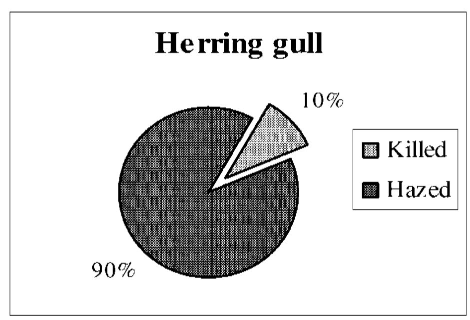


Figure 3.3: Percentage of herring gulls killed vs. hazed at all Corps dams on the Lower Columbia and Lower Snake Rivers.

Herring gull:
During the 5-year period (1997 to 2001), 1,411 herring gulls were hazed and 161 were lethally removed at all Corps projects on the Lower Columbia and Snake Rivers. The average per year was 282 and 32, respectively (USDA MIS 1996-2001). This represents a total hazed to killed ratio of 8.8 to 1. Hazing and kill data for the year 2002 was 2,767 and 48, respectively (see Appendix G). USDA (2001) also discusses the impacts of wildlife damage management activities on this species in Washington. Figure 3.3 shows the percentage of birds killed vs. hazed. The lethal take peaked in 2000 and was reduced in 2001 and 2002. The most hazing occurred in 2002.

Unidentified gulls:
During a 2-year period (1997 and 1998), an additional 24,578 unidentified gulls were hazed and 3,275 were lethally removed at all Corps projects on the Lower Columbia and Snake Rivers (USDA MIS 1996-2001). The total hazed to killed ratio for all gulls during the 5-year period is 11 to 1.

Double-crested Cormorants

During the 5-year period (1997 to 2001), 13,278 double-crested cormorants were hazed and 890 were lethally removed at all Corps projects on the Lower Columbia and Snake Rivers. The average per year was 2,656, and 178, respectively (USDA MIS 1996-2001). This represents a total hazed to killed ratio of 14.9 to 1. Hazing and kill data for the year 2002 was 7,583 and 6, respectively (see Appendix G). USDA (2001) also discusses the impacts of wildlife damage management activities on this species in Washington. Figure 3.4 shows the percentage of birds killed vs. hazed. The lethal take peaked in 1999 and decreased during each of the following years. The most hazing occurred in 2002.

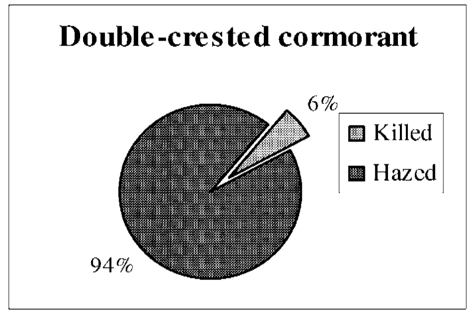


Figure 3.4: Percentage double-crested cormorants killed vs. hazed at all Corps dams on the Lower Columbia and Lower Snake Rivers.

The Double-crested Cormorant Final EIS (64 FR 60826; USFWS 2001) assesses various alternatives for managing increasing populations of double-crested cormorants throughout the nation. The need for action is based upon the correlation between increasing populations and the growing concern about associated negative impacts, thus creating a substantial management need to address those concerns. These concerns include impacts to other bird species through habitat destruction, exclusion, and/or nest competition; declines in fish population associated with double-crested cormorant predation; impacts to vegetation; and impacts to populations of ESA-listed fish species. The USFWS EIS does not specifically take into account the growing populations of double-crested cormorants in eastern Washington.

Western Grebe

Western grebe are identified as a secondary predator as they do not occur at the dams in great numbers. During the 5-year period (1997 to 2001), 3,426 western grebe were hazed and 258 were lethally removed at all Corps projects on the Lower Columbia and Snake Rivers. The average per year was 685 and 52, respectively (USDA MIS 1996-2001). This represents a total hazed to killed ratio of 13.3 to 1. Hazing and kill data for unidentified grebe in the year 2002 was 823 and 15, respectively (Appendix G). USDA (2001) also discusses the impacts of wildlife damage management activities on this species in Washington. Figure 3.5 shows the percentage of birds killed vs. hazed. The lethal take peaked in 1999. The most hazing occurred in

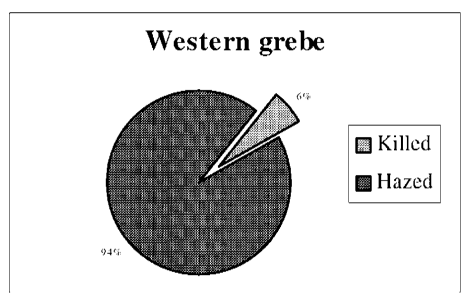


Figure 3.5: Percentage of western grebe killed vs. hazed at all Corps dams on the Lower Columbia and Lower Snake Rivers.

2000. Western grebe are able to enter interior dam spaces by diving and entering through underwater passages. Oftentimes these birds die because they cannot be captured and are not able to escape.

Other Avian Predators

Other avian predators include the remainder of the secondary predator species identified in Table 1.2. These include Caspian terns, common mergansers, American white pelicans, great-blue herons, and belted kingfishers. In most cases, these species are only hazed and not killed. The only exceptions are seven great blue herons that were taken in 1998, and one common merganser taken in 1997.

4.0 ENVIRONMENTAL EFFECTS

4.0.1 Method of Analysis

In the development of this EA, the following issues were identified for evaluation: biological, economic, socio-cultural, and physical impacts. This section analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis. The environmental consequences of each alternative are evaluated to determine if the potential impacts would cause a significant adverse effect. A summary of the alternatives and the environmental affects are compared in Table 4.1.

Table 4.1. Comparison of Alternatives and Environmental Consequences

	Alternative 1 No Action (Current Program)	**Alternative 2 Non-Lethal Tools Only**	**Alternative 3 Exhaust All Non-Lethal Tools First**
Relative effectiveness of control tools in reducing or minimizing damage to ESA-listed species	4.1.1 The program has been relatively effective in the past and would be expected to be the most effective and cost-effective alternative. No significant impact for target or secondary species.	4.2.1 Decreased relative effectiveness and increased program costs when compare to Current Program	4.3.1 Decreased relative effectiveness and increased program costs when compare to the Current Program
Impact on ESA-listed fish species and non-target avian predators	4.1.2 Non-target species - no negative impacts observed. T&E salmonid species – beneficial effect	4.2.2 Non-target species – same as Current Program. T&E salmonid species – potential for reduced beneficial effect	4.3.2 Non-target species - – same as Current Program. T&E salmonid species – potential for reduced beneficial effect
Impact on avian predator populations	4.1.3 Gulls – LOW and MODERATE overall impact rating Cormorants - LOW overall impact rating Secondary predators – LOW overall impact rating	4.2.3 Same as Current Program	4.3.3 Same as Current Program
Humaneness of control tools	4.1.4 Minimal concern and no significant impact	4.2.4 Same as Current Program	4.3.4 Same as Current Program
Impact on recreational and aesthetic opportunities	4.1.5 Minimal concern and no significant impact	4.2.5 Same as Current Program	4.3.5 Same as Current Program

A methodology to evaluate and determine whether or not biological impacts are significant was needed. Methodology established by the APHIS-WS Programmatic EIS (USDA 1997, revised) was evaluated and is included in this analysis. The method of considers the following evaluation factors:

- magnitude
- geographic extent
- frequency or duration
- likelihood of impact

Where a quantitative or qualitative evaluation is possible, specific criteria for the magnitude, geographic extent, duration and frequency, and likelihood of impacts are used for each of the major target species. This evaluation process is used to determine the significance of the impacts pursuant to Council on Environmental Quality (CEQ) regulations (40 CFR 1508.27). To determine the significance of an impact, all four of the evaluation factors must be considered together. Table 4.2 presents the entire range of possible evaluation factor combinations for determining the NEPA significance of adverse biological impacts.

Table 4.2. Criteria for Determining Significant Adverse Biological Impacts

	Biological Impact Evaluation Factors			
Impact Rating	**Magnitude**	**Geographic Extent**	**Duration & Frequency**	**Likelihood**
Significant (as defined by NEPA)	High	Moderate or High	Any Level	High
	High	Moderate or High	High	Moderate
Moderate	High	Any Level	Moderate or Low	Moderate
	High	Low	Any Level	High
	High	Any Level	Any Level	Low
	Moderate	Any Level	Any Level	Any Level
	Low	High	High	High
Low	Low	Moderate or Low	Any Level	High
	Low	Any Level	Any Level	Moderate or Low

The *magnitude* of an impact reflects relative size or amount of an impact. The *geographic extent* of an impact considers how widespread the program impact might be. The *duration and frequency* of an impact (whether the impact is a one-time event, intermittent, or chronic) also helps define the limits. The *likelihood* of an impact (whether the impact is likely to occur) is the final evaluation factor. A more in-depth description of each of the evaluation factors is provided in the following text.

A summary of the evaluation factor determinations for the Current Program, for each species, is provided in Table 4.3. The information in the table is discussed and determined in the following sections.

Table 4.3. Evaluation Factors and Overall Impact Rating Summary by Species for the Current Program

Species	Magnitude	Geographic Extent	Duration & Frequency	Likelihood	Overall Impact Rating
California Gull	Low	Low	High	High	Low
Ring-billed Gull	Low	Low	High	High	Low
Herring Gull	Low	Low	High	High	Low
Double-crested Cormorant	Low	Low	High	High	Low
Secondary Predators	varies	Low	High	Low	Low

4.0.1.1 Magnitude

The magnitude of an impact reflects relative size or amount of an impact. Magnitude is defined as a measure of the number of animals killed in relation to their abundance. In this analysis, magnitude is evaluated first in terms of total take (number of individuals killed), then in terms of the APHIS-WS program. Magnitude evaluations for each of the five primary predator species are limited to Washington State. The procedures for determining magnitude are detailed in Figure 4.1.

Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable take levels, and actual take data. The Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, and USFWS do not currently have quantitative data on bird species discussed in this EA. None of these species are managed for recreational purposes. Qualitative determinations are based on population trends and take data when available. This EA will use qualitative data because quantitative data do not exist. Appendix G Table1 present the numbers of birds killed and hazed, by species, as a result of the need for avian predation deterrence management on the Lower Columbia and Snake Rivers between FY 1997-2002.

Magnitude is considered along with ratings for geographic extent, duration and frequency, and likelihood to determine NEPA significance of the program for each of the five primary predator species analyzed in detail in this EA.

Criteria for Qualitative Determinations

When an allowable take level, established by USFWS, is not available, the magnitude rating for total take is based solely on State and regional population trends. The use of population trends as an index of magnitude is based on the assumption that the annual Depredation Permit Take does not exceed allowable take levels. The criteria for rating total Depredation Permit Take magnitude on the basis of bird population trends are as follows:

- If the population trend is increasing, the magnitude is considered low.
- If the population trend is stable, the magnitude is considered moderate.

- If the population trend is decreasing, the magnitude is considered high.

For purposes of this analysis, when a State or region reports overlapping population trends (e.g. increasing or stable, stable or decreasing), magnitude ratings are based on the most conservative trend. For example, a trend reported as increasing or stable translates to a magnitude rating of moderate. Magnitude determinations are not made when information on population numbers or trends are unavailable.

The APHIS-WS program kill magnitude is rated only for the species where total Depredation Permit take magnitude is rated (i.e. a population trend estimate is available). APHIS-WS kill magnitude is based on the fraction of total Depredation Permit take attributed to APHIS-WS program activities. Magnitude ratings for the APHIS-WS kill are based on the following criteria-

- If APHIS-WS kill is less than or equal to 33 percent of the total Depredation Permit take, the magnitude is considered low.
- If APHIS-WS kill is greater than 33 percent but less than or equal to 66 percent of the total Depredation Permit take, the magnitude is considered moderate if population trend is decreasing, or low if the population trend stable or increasing.
- If APHIS-WS kill is greater than 66 percent of the total Depredation Permit take, the magnitude is considered equivalent to the Population Trend rating.

The APHIS-WS kill magnitude cannot exceed the population trend rating because the APHIS-WS take is only a portion of the total take. APHIS-WS kill magnitude and total Depredation Permit take magnitude are equal when the APHIS-WS take constitutes more than 66 percent of the total depredation take. APHIS's take of piscivorous birds for the Corps usually constitutes more than 66% of all reported take authorized by USFWS.

4.0.1.2 Geographic extent

The geographic extent of an impact considers how widespread the program impact might be. Geographic extent of the program impact is determined by the percentage of the Lower Columbia and Snake Rivers where APD program management is implemented. For the purpose of this analysis, the Lower Columbia and Snake Rivers region is defined as the area stretching from the barge discharge location near Columbia RM 140, to the confluence of the Snake and Columbia Rivers (approximately Columbia RM 324), and on the Lower Snake River from RM zero to one mile upstream of Lower Granite Dam (Snake RM 108). Altogether, this area comprises approximately 202 river miles. Activities are conducted at site-specific locations around each dam site, but for the purpose of this analysis these activities are considered to occur within one mile of each dam. For purposes of this EA, the geographic extent of the program take is divided into three levels.

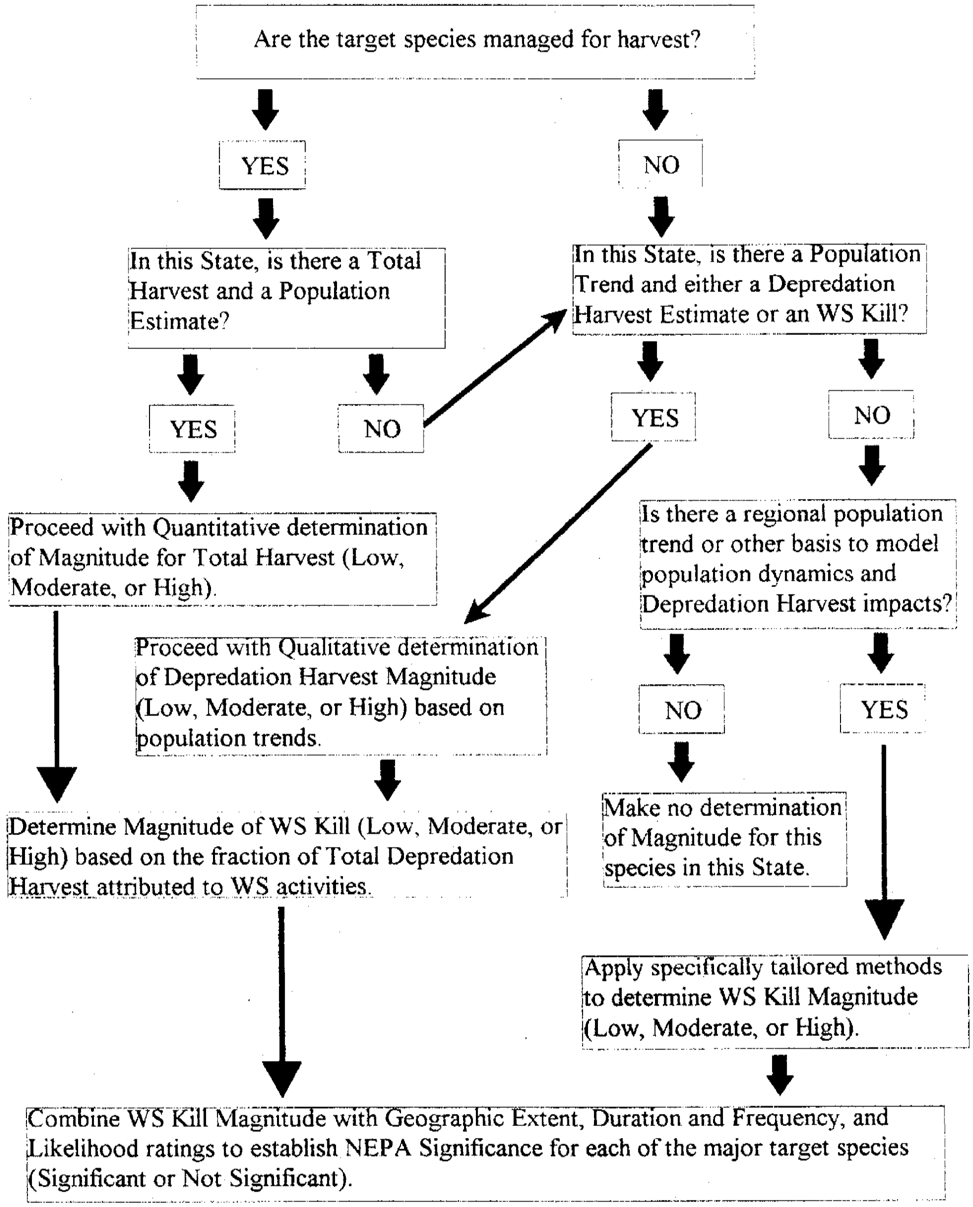


Figure 4.1. Procedures for evaluating APHIS-WS Program Impacts on abundance of major target species, as established in the USDA-APHIS ADC Programmatic EIS (1997, revised)

The program effect is:

Low; if the species take occurs in less than 34 percent of the area along the Lower Columbia and Snake River region.
Moderate; if the species take occurs in 34 to 66 percent of the area along the Lower Columbia and Snake River region.
High; if the species take occurs in more than 66 percent of the area along the Lower Columbia and Snake River region.

The project footprint comprises the eight dam sites, and the barge release site. Conservatively assuming a maximum of one mile upstream and downstream per dam, and the barge release site as 4 miles long, the total project length is estimated as 20 miles. Therefore, using the maximum project area, approximately 10 percent of the geographic area is affected, which corresponds to the low impact determination. Since the geographic extent is independent of species type, the impact for all species would be LOW.

4.0.1.3 Duration and frequency

The duration and frequency of an impact (whether the impact is a one-time event, intermittent, or continual) also helps define the limits. Duration refers to how many years the control activity has been or could be in operation. Frequency refers to the distinction between continual or intermittent control activities. Continual refers to control actions that occur regularly throughout the year. Intermittent refers to actions that occur sporadically or infrequently throughout the year. The evaluation criteria for duration and frequency are as follows:

Low duration and frequency is assigned if a few individuals of a species were taken in 2000, 2001 or 2002, and this species <u>is not expected</u> to be killed each year in the future. Birds may be taken every year, but only intermittently.
Moderate duration and frequency is assigned if individuals of a species were taken periodically in 2000, 2001 or 2002, and this species <u>is expected</u> to be taken each year in the future. When damage is severe, lethal control is expected and may occur during critical times, but not continually.
High duration and frequency is assigned if individuals of a species were taken over a number of years and are expected to be taken in the future. Year-round lethal measures are expected to continue because the damage problem is not expected to dissipate. Alternatively, birds may not be taken year-round but may be taken on a seasonal basis every year.

4.0.1.4 Likelihood

The likelihood of an impact (whether the impact is likely to occur) is the final evaluation factor. As long as predation or damage continues, the likelihood of control actions occurring is high. When an event is unpredictable or accidental, then the likelihood factor is moderate or low, respectively.

4.0.2 Issues and Concerns

The following avian bird deterrent management issues and concerns were identified as relevant to this process:

1. Relative effectiveness of control measures in reducing or minimizing damage to ESA-listed species.
2. Possible impact of control tools on non-target and ESA-listed species.
3. Impact on the populations of avian predators (target species).
4. Humaneness of control tools.
5. Recreation

4.1 Impact of the No Action Alternative (Current Program – Alternative 1)

4.1.1 Relative Effectiveness in Reducing Avian Predator Activity

The effectiveness of the program may be assessed by determining how successful the tools used were at reducing avian predators usage of areas susceptible to predation in or below fish ladders, spillways, and bypass facilities. Quantifiable data on the effectiveness of individual tools implemented at site-specific areas on the Lower Columbia and Snake Rivers are not available. Jones et. al 1998, 1999 studied the effectiveness of APHIS-WS hazing and lethal deterrent methods, but could not make clear conclusions due to low number of observation data points. Jones et. al 1999 suggests that variability in gull behavior from project to project and the variability in the number of gulls present at any feeding location are complicating factors in analyzing the data. The effectiveness of each tool may be evaluated by using on-site observations by specialists who apply the control action and research conducted on each particular tool. The current program was developed by APHIS-WS from years of observing daily bird behavior in response to various non-lethal and lethal control methods. A passive exclusion system with an intensive hazing program reinforced with limited lethal control, has been determined to be the most effective at reducing the amount of time avian predators spend in susceptible predation areas. The relative effectiveness of avian predator activity for the other alternatives is discussed in Sections 4.2.1 and 4.3.1.

4.1.2 Impact on ESA-listed Fish Species and Non-target Avian Predators

The tools used under the No-Action alternative are selective for target species. All capture and removal tools allow for positive identification of target species in order to prevent non-target take. There have been no negative impacts observed on non-target birds. The Corps provided its Biological Assessment to USFWS and NMFS, which identified the program's expected effect on ESA-listed species. The assessment determined that the proposed program may affect, but is not likely to adversely affect bald eagles and bull trout, and would either have no effect on the other ESA-listed listed species or possibly a beneficial effect (see Appendix C). This issue does not pose a significant environmental impact.

4.1.3 Impact on Avian Predator Populations

Analysis of avian predator populations is limited to those species lethally removed during avian predator deterrent management. The analysis for magnitude of impact defines magnitude as "*...a measure of the number of animals killed in relation to their abundance*." Magnitude may be determined either quantitatively or qualitatively. (see Section 4.0.1 of this document and Chapter 4 of the USDA-APHIS-WS Programmatic EIS (1997, revised)). Quantitative determinations are based on population estimates, allowable take levels, and actual take data. Qualitative determinations are based on population trends and take data when available. The determination of significance is evaluated qualitatively for each target species.

At the Corps dams, APHIS-WS conducts lethal control under the current program in order to condition a behavioral response to non-lethal measures. This is typically required when piscivorous bird population densities are relatively high and non-lethal tools are ineffective. Tables 1 through 9 Appendix G show, by species, the numbers of birds killed and hazed at Corps hydroelectric dams as a result of APD management on the Lower Columbia and Snake Rivers between 1997 and 2002.

Individual colony data have been collected, but precise counts of the bird populations in the Lower Columbia and Snake River region do not exist. When precise population estimates are lacking, it is common practice for management agencies to use population trend analyses to determine if species populations are 'increasing', 'stable', or 'decreasing'. These trend analyses are determined by taking actual counts at specific locations at regular intervals and comparing several years of data. When the Breeding Bird Survey (BBS) and Christmas Bird Count (CBC) routes do not include habitat commonly used by avian predators, direction from wildlife management agencies and published literature, such as those mentioned above, may be used to determine population trends. Often times, published literature provides some of the best information available on population trends.

Breeding Bird Survey

The BBS is a large-scale survey initiated 1966 to monitor the status and trends of breeding birds throughout North America. This survey has provided more than 30 years of data on abundance, distribution, and population trends for more than 400 bird species (Downes and Collins 2003). These data are calculated annually by the United States Geologic Survey (USGS) Patuxent Wildlife Research Center. The BBS index is taken from the BBS, a summer count survey conducted by volunteers and coordinated by the USGS to monitor long-term population trends at the state, regional, and national level. Like other surveys, the BBS is based on a number of assumptions, biases, and limitations. For example, the BBS is limited by placement of roads, traffic noise interference in some cases, and preference of some bird species for roadside habitats (Bystrak 1981). Given that 22% of the species in the survey can be characterized as birds with specialized habitats or limited distribution in the BBS range (Sauer et al.

2001). This survey has not characteristically been the best population monitoring tools for colonial nesting species such as gulls, terns, and cormorants. BBS counts of all the species discussed in this EA can be highly variable and inconsistent from one year to the next. The BBS generally uses roads for survey routes, and as such, it has not characteristically been the best population monitoring tool for colonial nesting species such as gulls and cormorants. A measure of the statistical significance of a trend is represented by a "P" value. The USFWS has stated that those species with "P" values greater than 0.1 do not show trend estimates with an acceptable level of certainty or significance (USDA 2001).
BBS data are provided at http://www.mbr-pwrc.usgs.gov/bbs/bbs.html.

Christmas Bird Count
The CBC index is derived from a winter count survey conducted by the National Audubon Society (NAS) in December and January, and is used primarily as a historical reference to indicate declines in species at the state, regional, and national level. The 100-year population trend analysis was derived from CBC survey year 1901 through 2001 in both Washington and Oregon States. Unlike the BBS, large portions of the Columbia River basin, including those areas along the Lower Columbia and Snake Rivers are surveyed by the CBC. Winter weather patterns often affect bird migrations, therefore these counts vary from year to year. CBC data are provided at http://www.audubon.org/bird/cbc/hr/.

Published Literature
California gulls, ring-billed gulls, and double-crested cormorants are the primary avian predators in the Columbia River basin (NMFS 2000 b,c). A fairly large body of published literature exists which documents population trends and other biological information for these species.

Appendix G contains BBS and CBC data and published literature for primary and secondary predators, and contains the details for the impact analysis that were performed.

4.1.3.1 Summary of impacts to gulls

The target gull species considered were *California gull*, *ring-billed gull*, and *herring gull.* The determination made is that the program is not likely, nor designed, to impact gull populations on a regional basis. To reduce gull usage of site-specific areas where juvenile salmonids are unnaturally exposed and susceptible to predation may require that some individuals be lethally removed. Most of the lethal efforts to reduce damage have been directed toward California and ring-billed gulls (Appendix G, Table 1). Thus far, there has been no discernable impact on gull population levels.

Evaluation factor determination for Gulls

In order to determine the significance of the program on California, ring-billed, and herring gull populations in Washington State, the magnitude, geographic extent, and duration and frequency of the program activities were assessed, as well as the likelihood of those activities occurring in the future.

Magnitude

- California gull population trend: INCREASING
- Ring-billed gull population trend: INCREASING
- Herring gull population trend: INCREASING
- The APHIS-WS program take in Washington State is greater than 66 percent of the total Depredation Permit take of both California and ring-billed gulls.

Since the take is greater than 66 percent of the of the total depredation permit take, the magnitude is considered equivalent to the population trend rating. Therefore, based on the criteria established is Section 4.0.1, since local populations are increasing, the magnitude of the program effect on California, ring-billed, and herring gulls are LOW.

Geographic Extent

The program is implemented at site-specific locations that comprise approximately 10% of the Lower Columbia and Snake Rivers region. Therefore, based on the criteria established is Section 4.0.1, the geographic extent factor of the program on gull species is LOW.

Duration and Frequency

California, herring, and ring-billed gulls were taken periodically in 2001 and 2002 and are expected to be taken each year in the future.

These species are opportunistic and follow juvenile fish migration. Therefore, the taking of these species on a seasonal basis at hydroelectric dams and hatchery facilities is expected. Based on the criteria established is Section 4.0.1, the duration and frequency factor of the program on gull species is determined to be HIGH.

Likelihood

The presence of California, ring-billed and herring gulls at hydroelectric dams and hatchery facilities during smolt migration is predicted to continue.

California and ring-billed gull population trends are increasing and program activities to reduce ESA-listed and non-listed juvenile salmonid predation at site-specific areas along the Lower Columbia and Snake Rivers have not negatively impacted populations of gull colonies. Therefore, based on the criteria established in Section 4.0.1, the likelihood of control actions being requested and carried out to reduce California, ring-billed and herring gull usage of tailraces and hatchery facilities is determined to be HIGH.

Impact rating determination for gulls

Based upon the analysis above, the impact of APD management activities on California, ring-billed and herring gulls is determined to be LOW based on Table 4.2 criteria.

A cumulative impact analysis of gulls taken at Corps facilities indicated the take level of California, ring-billed, and herring gulls for the purpose of site-specific damage control was not likely to affect populations at the regional or national scale (USDA 2001). Overall, based upon recent and historical studies conducted on California and ring-billed gulls in the Pacific Northwest, these trends show populations that currently appear to be healthy and increasing, and herring gull populations that appear to be healthy and stable or increasing.

4.1.3.2 Summary of impacts to double-crested cormorants

The determination made is that the program is not likely, nor designed, to impact double-crested cormorant populations on a regional basis. However, some individuals could be killed on a site-by-site basis. Thus far, there has been no discernable impact on double-crested cormorant population levels.

Evaluation factor determination for Double-crested cormorants

In order to determine the significance of the program on double-crested cormorant populations in Washington State, we examined the magnitude, geographic extent, and duration and frequency of activities, as well as the likelihood of those activities occurring in the future.

Magnitude

- Double-crested cormorant population trend: INCREASING
- The APHIS-WS program take in Washington State is greater than 66 percent of the total Depredation Permit take of double-crested cormorants.

Since the take is greater than 66 percent of the of the total depredation permit take, the magnitude is considered equivalent to the population trend rating. Therefore based on the criteria established in Section 4.0.1, since local populations are increasing, the magnitude of the program on double-crested cormorants is LOW.

Geographic Extent

The program is implemented at site-specific locations that comprise approximately 10% of the Lower Columbia and Snake Rivers region. Therefore, based on the criteria established in Section 4.0.1, the geographic extent factor of the program on Double-crested cormorants is LOW.

Duration and Frequency
Double-crested cormorants were taken periodically in 2001 and 2002 and are expected to be taken each year in the future.

This species feeds almost exclusively on fish, therefore, the taking of these species on a seasonal basis at hydroelectric dams and hatchery facilities is expected. Based on the criteria established in Section 4.0.1, the duration and frequency factor of the program on double-crested cormorants is determined to be HIGH.

Likelihood
The presence of double-crested cormorants at hydroelectric dams and hatchery facilities during smolt migration is predicted to continue.

Double-crested cormorant population trends are increasing, particularly in eastern Washington, and program activities to reduce ESA-listed and non-listed juvenile salmonid predation at site-specific areas along the Lower Columbia and Snake River region have not negatively impacted cormorant colony population. Therefore, based on the criteria established in Section 4.0.1, the likelihood of control actions being requested and carried out to reduce double-crested cormorant usage of the tailrace areas below hydroelectric dams and at hatchery facilities is HIGH.

Impact rating determination for Double-crested cormorants

Based upon the analysis above, the impact of APD management activities on double-crested cormorants is determined to be LOW based on Table 4.2 criteria.

The No-Action alternative is not likely, nor designed, to impact double-crested cormorant populations on a regional basis. To reduce double-crested cormorant usage of site-specific areas where juvenile salmonids are unnaturally exposed and susceptible to predation may require that some individuals be lethally removed. Impact to double-crested cormorant population levels has not been discernable. The cumulative impact of double-crested cormorants take level at Corps facilities, for the purpose of site-specific damage control, was not likely to affect populations at the regional or national scale (USDA 2001). Overall, based upon recent and historical studies conducted on double-crested cormorants in the Pacific Northwest, these trends show populations that currently appear to be healthy and increasing.

4.1.3.3 Impact to secondary avian predators

Limited lethal control of western grebes, and common mergansers (Appendix G, Table 1) has been authorized under the current program when individuals congregate in or below fish ladders, spillways, and outfalls or within a facility (eg. bypass channel), and only when non-lethal deterrents have been ineffective. This control would be expected to continue at levels that the USFWS would determine to be insignificant to population health and viability at the local, regional, and national scale.

American white pelicans are listed as a Washington State endangered species. The American white pelican's persistence and use patterns below the McNary Dam complex implicates them as contributors to juvenile salmonid mortality (CORPS 2003). They were consistently observed in the tailrace in small numbers in mid-April, 2002. A maximum instantaneous count of 24 pelicans was recorded. The diel foraging pattern of the pelicans generally coincided with the diel pattern of salmonid passage through the bypass system. Bird deterrent measures employed at the dam for other piscivorous birds initially altered the foraging behavior of the American white pelicans. However, the pelicans rapidly acclimated (CORPS 2003).

State agencies have also expressed concern for great-blue heron colonies. Therefore, great-blue herons and American white pelicans would not be taken, under the program. American white pelicans would only be intentionally hazed if they are within 50 feet of the juvenile fish outfall for longer than 10 minutes. All secondary predators, including great-blue heron and American white pelican, may be subject to non-lethal measures when congregated at the same site-specific areas where juvenile salmonids are unnaturally exposed and susceptible to predation.

Caspian tern population trends are increasing and activities to reduce ESA-listed and unlisted juvenile salmonid predation at locations along the Lower Columbia and Snake Rivers have not negatively impacted the species population trend in the region (Roby et al. 2003, Roby et al. 1999). The number of Caspian terns hazed at the dams has increased in the past several years (Appendix G Table 1), which indicates an increased presence. Caspian terns are currently hazed only, and therefore the program ahs a low impact on Caspian terns. The likelihood of future control actions being requested and carried out to reduce Caspian tern usage of tailrace areas is unpredictable and contingent upon the results of ongoing research.

Since secondary predators are generally defined as those seen occasionally on-site, they are by definition low in numbers, and therefore the magnitude of impact can be assumed to be LOW. An exception would be in the case of a sensitive, threatened of endangered species, such as American white pelican. However the program's magnitude of impact on white pelican would similarly be low because individuals would be protected based on their sensitive status.

The geographic extent for the program is also determined to be LOW, based on a project size of 10% of the size of the region. The combined factors of low magnitude and low geographic extent, based on Table 4-2, determine a LOW impact rating. Therefore, the impact rating for all secondary predators is LOW, and consequently impacts to secondary predators are not significant.

4.1.4 Humaneness of Control Tools

The issue of humaneness, as it relates to the killing or capturing of wildlife is an important and complex concept that can be interpreted in a variety of ways. Humaneness is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. Some individuals and groups are opposed to some of the management actions and tools used by the Corps. Most animal welfare organizations do not oppose the concept of wildlife damage control. However, these organizations support restrictions on control tools perceived by them as inhumane, and strongly emphasize the use of non-lethal tools. Animal rights advocates oppose any killing or harming animals for human gain, because they believe animals have rights equal to or similar to humans (Schmidt 1989, Wywialowski 1991). Other organizations believe that birds are being unnecessarily targeted as scapegoats for salmon losses, while diverting attention away from the real threats to salmon, which include dams and loss of habitat (Seattle Audubon Society, Action Alert, undated). Other bird groups recognize that avian predation may be significant in rare, localized situations (American Bird Conservancy, Policy). Most wildlife managers agree that lethal control is a sound, and sometimes necessary, wildlife resource management practice (Berryman 1987).

Exclusion techniques, as would be implemented, would be expected to have little or no effect on humaneness. Some could argue that behavior modification (through harassment) is stressful to the target species. Some could view removal of selected individuals, which are acclimated to hazing, as inhumane. The Corps supports the most humane, selective, and effective control techniques that meet the program objectives. Control tools employed under Alternative 1 are listed and discussed in Section 2.1. The humaneness of the lethal take control tool under Alternative 1 does not pose a significant environmental impact.

4.1.5 Impact on Recreational and Aesthetic Opportunities

The exclusion systems and hazing efforts relocate bird species to areas outside the restricted areas and into adjacent publicly accessible areas. Dispersing birds out of the restricted and protected areas make them more accessible for general viewing by the public at large.

Aesthetics is the philosophy dealing with the nature of beauty or the appreciation of beauty. Therefore, aesthetics is subjective in nature, dependent on what an observer regards as beautiful or distasteful. The mere knowledge that wildlife exists is a positive benefit to many people (Fulton et al. 1996). Human dimensions of wildlife damage management include identifying how people are affected by problems or conflicts between them and wildlife, attempting to understand people's reactions, and incorporating this information into policy and management decision processes and programs (Decker and Enck 1996; Decker and Chase 1997).

The Corps recognizes the recreational opportunity and aesthetic importance of wildlife and associated viewing opportunities, but also acknowledges that increased opportunity for predation of threatened and endangered juvenile salmonids occur at site-specific areas. Under the proposed program there would be minimal localized impact on specific viewing opportunities of some individual birds or flocks during and after hazing or lethal take events. However, wildlife populations as a whole have not been negatively affected, and viewing opportunities may have been relocated to areas more accessible to the public. The positive impact of increased public viewing opportunities would be expected to continue. The environmental impact of recreational/aesthetic opportunities does not pose a significant environmental impact.

4.2 Impact of the Non-Lethal Only Alternative (Alternative 2)

4.2.1 Relative Effectiveness in Reducing Avian Predator Activity

The effectiveness of control measures under this alternative would most likely decrease when compared to Alternative 1, because lethal tools implemented would no longer be available. The Corps would use only non-lethal tools to resolve piscivorous bird damage situations under this alternative. Technical assistance would be provided in the context of a modified IWDM approach. The Corps would still use the APHIS-WS Decision Model to determine the best approach for resolving wildlife damage, but lethal tools would be administratively screened from consideration in formulating control strategies. Persistent avian predators that become desensitized to hazing would be allowed to remain in the areas where juvenile salmon are susceptible to predation in or below fish ladders, spillways, and bypass facilities. As a result, this alternative would less effectively minimize and mitigate impacts to ESA-listed salmonids to the "maximum extent practicable" as stated by NMFS 2000 BiOp, RPA action 101. In order to compensate for the decreased relative effectiveness, additional and potentially substantial cost would be incurred in an attempt to obtain effectiveness equivalent to that of Alternative 1. In time, non-lethal technologies may be developed that would deter these persistent predators at a cost comparable to that achieved under Alternative 1, but the timeframe for their development of these technologies is unknown. It is most likely and reasonable to expect that Alternative 2 would be substantially more costly than Alternative 1 and does not pose a significant environmental impact.

4.2.2 Impact on ESA-listed Fish Species and Non-Target Avian Predators

Alternative 2 would have minimal impact on non-target avian species. Without the lethal control tool available in Alternative 1, there is a potential for impact on ESA-listed fish species when piscivorous birds to fail to associate danger and death with loud noises, and when individual birds that are not frightened away, in turn attract more birds beneath the wire exclusionary systems. Additional non-lethal efforts would be required to prevent avian predators from congregating where smolts are most vulnerable to prevent potentially impacting ESA-listed fish species. This issue does not pose a significant environmental impact.

4.2.3 Impact on Avian Predator Populations

The alternative would have minimal impact on avian predator populations. It would be expected that the impact of Alternative 2 would be similar to Alternative 1, because the annual take of piscivorous birds at Corps dams is low when compared to overall populations. Additionally, the loss of lethal tools may lead to the accelerated habituation of piscivorous birds to non-lethal tools, rendering non-lethal tools less effective or ineffective at deterring feeding in areas where smolts are most vulnerable.

4.2.4 Humaneness of Control Tools

This alternative would not request lethal direct control of avian for the protection of ESA-listed salmonids. Therefore some would say that this alternative is more humane that Alternatives 1 and 3, that could employ the use of lethal control. The environmental impact of the humaneness of control tools is the same as Alternative 1, in that it does not pose a significant environmental impact.

4.2.5 Impact on Recreational and Aesthetic Opportunities

The impact on recreational and aesthetic opportunities by this alternative would be similar to the Alternative 1 (Section 4.1.5), because the exclusion systems and hazing efforts disperse birds out of the restricted and protected areas and make them more accessible for general viewing by the public at large. The potential need to construction more elaborate exclusionary systems downstream on each dam to attempt to compensate for the effectiveness loss of lethal control may decrease the aesthetic value of those who use the river for recreation. Fishing tackle has been retrieved from those wires furthest downstream, and on rare occasions these wires appear to have been intentionally cut. The environmental impact of recreational/aesthetic opportunities is the same as Alternative 1, in that it does not pose a significant environmental impact.

4.3 Impact of the Exhaust All Non-Lethal Tools First Alternative (Alternative 3)

4.3.1 Relative Effectiveness of Reducing Avian Predator Activity

Alternative 3 would require that all non-lethal tools be implemented regardless of practicality before any lethal tools are recommended or used. Practicality is defined as being *disposed to action as opposed to speculation or abstraction... designed to supplement theoretical training by experience* (Merriam-Webster 1999). Under Alternative 3, *any* non-lethal tool that may reduce avian predation would be used before any lethal tool would be implemented. For example, even speculative untested methods or costly less effective methods would take precedence over the use of any lethal tool.

The effectiveness of tools under this alternative would potentially be decreased compared to the Alternative 1, because use of lethal tools may be delayed. Implementing less effective non-lethal methods prior to more relatively effective lethal methods would less effectively minimize and mitigate impacts to ESA-listed salmonids to the "maximum extent practicable" as stated by NMFS 2000 BiOp, RPA action 101. Implementing any non-lethal alternative to deter persistent predators, even those with decreased effectiveness, would be at a greater cost than Alternative 1. In order to compensate for the decreased relative effectiveness, additional and potentially substantial cost would be required to obtain the same effectiveness. In time, non-lethal technologies may be developed that would deter these persistent predators at a comparable cost, but the timeframe for development of these technologies is unknown.

It is most likely and reasonable to expect that Alternative 3 would be significantly more costly than Alternative 1 and does not pose a significant environmental impact.

4.3.2 Impact on ESA-listed Fish Species and Non-Target Avian Predators

Impacts on non-target and ESA-listed species by Alternative 3 would be similar to Alternative 2 (Section 4.2.2), which is minimal impact on non-target species and ESA-listed salmonid species, provided additional non-lethal effort to compensate for the reduced effectiveness is implemented. This issue does not pose a significant environmental impact.

4.3.3 Impact on Avian Predator Populations

The impact by of Alternative 3 on avian predator populations would be similar to Alternative 1 (Section 4.1.3). This is based on the expectation that lethal tools used under Alternative 1 are used only when non-lethal tools have already been used, or are not expected to be effective. Additionally, the loss of lethal tools may lead to the accelerated habituation of piscivorous birds to non-lethal tools, rendering non-lethal tools even less effective or ineffective at deterring feeding in areas where smolts are most vulnerable.

4.3.4 Humaneness of Control Tools

The humaneness of the control tools under this alternative would be comparable to Alternative 1 (Section 4.1.4). However, some people would believe that exhausting all non-lethal tools before using lethal tools would be more humane than Alternative 1. Others would believe that unnecessarily delaying lethal control would result in the removal of more birds, and thus, be less humane than the Alternative 1. Belant et al. (2000) observed that as bird populations increased, more depredation problems developed, resulting in more birds being taken when lethal tools were ultimately implemented. The environmental impact of the humaneness of control tools is the same as Alternative 1 and 2, in that it does not pose a significant environmental impact.

4.3.5 Impact on Recreational and Aesthetic Opportunities

The impact of this alternative on recreational and aesthetic opportunities would be similar to the Alternative 1 (discussed in Section 4.1.5), because the exclusion systems and hazing efforts disperse birds out of the restricted and protected areas and make them more accessible for general viewing by the public at large. The potential need to construct more elaborate exclusionary systems downstream of each dam to attempt to compensate for the effectiveness loss of lethal control may decrease the aesthetic value of those who use the river for recreation. The exclusion systems and hazing efforts would disperse birds out of the restricted and protected areas and may make them more accessible for general viewing by the public at large. The environmental impact of recreational/aesthetic opportunities is the same as Alternative 1 and 2, in that it does not pose a significant environmental impact.

5.0 ENVIRONMENTAL COMPLIANCE

Several Federal laws regulate wildlife damage management. The Corps is in compliance with these laws and continues to consult and cooperate with other agencies as appropriate.

National Environmental Policy Act (NEPA). (42 USC Section 4231, *et seq.*)
This EA is being prepared pursuant to the NEPA and CEQ implementing regulations, which state that Federal agencies shall identify the effects that their proposed actions may have on the environment. Based on information in the EA, the Corps would determine whether the proposed activity would have a significant effect on the human environment. If it does, an EIS is required. If it is determined that the proposal would not have significant impacts, a Finding of No Significant Impact (FONSI) would be prepared.

NEPA requires that actions be evaluated for environmental impacts, that the decision maker(s) prior to implementation consider these impacts, and that the public be informed. This EA would remain valid until the Corps determines that new needs for action, changed conditions, or new alternatives having different environmental effects that must be analyzed. At that time, this analysis and document may be revised or amended pursuant to NEPA requirements.

This EA has been prepared in compliance with NEPA and currently no significant impacts have been identified. If no significant impacts are identified during the public review process, an EIS would not be required and full compliance with NEPA would be achieved once the FONSI is signed.

Endangered Species Act. (16 USC 1531-1544)
The ESA establishes a national program for conservation of endangered and threatened species and their habitat. The Corps conducts consultations with the USFWS and NMFS, as appropriate, to ensure that the Corps' actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify their critical habitats.

The Corps prepared a BA (see Appendix C) that evaluated the affects of the proposed project on the species identified on the Threatened and Endangered species list (see Appendix F). The Corps has determined that the project may affect, but is not likely to adversely affect bald eagles, bull trout, and anadromous fish. The project would have no affect on the other listed species. USFWS consultation correspondence is contained in Appendix I.

For a related project, a Corps BA was prepared for the Bonneville 2 Corner Collector and was submitted to USFWS on March 18, 2002. It determined that the project, including the effort to add flagged exclusion system wires, "may affect, but is not likely to adversely affect" bald eagles. USFWS concurred on May 6, 2002.

The ESA consultation process initially concluded by the 2000 FCRPS BiOp (NMFS 2000b) for this action has now been replaced by the 2004 Biological Opinion on Remand and associated Final Updated Proposed Action (UPA). Avian predation abatement (identified as deterrence in this EA) is addressed in the UPA under "Operation and Maintenance of FCRPS Fish Facilities" where it is considered part of the routine operation and maintenance activities at an FCRPS dam. The Corps will continue to follow the criteria included in the Corps' Fish Passage Plan as annually updated through the FPOM team. The Corps will coordinate with NOAA Fisheries to reconcile comments on the annual Draft Fish Passage Plan concerning ways to reduce take, including take by avian predators, as part of this process prior to the fish passage season or during the fish passage season. The UPA acknowledges that avian deterrent actions are being implemented at FCRPS structures. Therefore, the effects of the preferred alternative, Non-Lethal Tools Only, are addressed in the 2004 Biological Opinion on Remand.

Migratory Bird Treaty Act (MBTA). (50 CFR 13, 20, 21)
The MBTA provides the USFWS regulatory authority to protect species of birds that migrate outside the United States. The MBTA prohibits the harming, harassing and take of protected species, except as permitted by the USFWS. Regulated actions within the Corps' current program have been implemented by APHIS-WS and they have obtained a Federal Fish and Wildlife permit covering management activities that involve the taking of migratory species in Washington and Oregon States.

Animal Damage Control (ADC) Act. (7 U.S.C. 426-426c; 46 Stat. 1468)
The ADC Act, together with the Rural Development, Agriculture, and Related Agencies Appropriations Act language, authorize and direct APHIS-WS to reduce damage caused by wildlife in cooperation with other agencies. The purpose of the APD program is to reduce damage caused by wildlife. The program implements animal damage control measures by using hazing and exclusion tools, with very limited, individual specific lethal control to supplement non-lethal tools when they are ineffective.

Migratory Birds (EO-13186). Executive Order 13186 directs Federal agencies to incorporate bird conservation considerations into agency planning, including NEPA analyses; reporting annually on the level of take of migratory birds; and generally promoting the conservation of migratory birds without compromising the agency mission. The program reports annual take, and promotes the conservation of migratory birds by using hazing and exclusion tools, with very limited, individual specific lethal control to supplement non-lethal tools when they are ineffective.

Fish and Wildlife Coordination Act, as amended (16 USC 661, et seq)
This EA is tiered under two EISs, which were both coordinated with the USFWS. USFWS provided a Coordination Act Report (CAR) for each of these EISs. The joint Memorandum of Agreement dated January 22, 2003, between the Corps and USFWS, requires a CAR for new significant actions at existing projects (CORPS and USFWS 2003). The APD program is not a new action and the Alternative 1 Current Program proposed by this EA does not require a significant change. Therefore, the development

of a coordination act report for this project is not required, and this project is in compliance with the Act.

Heritage Conservation

Federal historic and cultural preservation acts include the National Historic Preservation Act (NHPA) (16 USC 470-470t, 110), Native American Graves Protection and Repatriation Act (NAGPRA) (43 CFR 10), Archeological Resources Protection Act (16 USC 470aa-470ll), Archeological and Historic Preservation Act (16 USC 469-469c), American Antiquities Act (16 USC 431-433) and American Indian Religious Freedom Act (42 USC 1996). As required under Section 106 of NHPA, the Corps is coordinating with the Oregon State Historic Preservation Office (SHPO) and Washington Office of Archeology and Historic Preservation (OAHP), and other interested parties.

No activities proposed in this EA would adversely affect resources protected under these acts. The Corps consulted with the Oregon State SHPO and Washington State OAHP regarding the currently planned project and determined that the addition of the proposed bird exclusion systems would not alter the historic character of dams old enough to warrant protection under Federal laws. The Bonneville Dam is old enough to warrant protection under Federal laws, but the project does not propose modifications to the existing exclusion system. Only the McNary project was consulted, since it is the only project site where both construction work is being proposed (spillway tailrace area exclusion system protection) and the site would be eligible for the National Register before installation was completed.

The potential future historic character of the other dams, not yet protected by Federal laws, would not be degraded by proposed modifications (see Table 2.2). Therefore, the Corps made the determination that the currently planned portion of the project would affect no historic properties. See Appendix E for the Cultural Resource Inventory report provided to the Oregon State SHPO and Washington State OAHP. At such a time as future construction efforts under the APD program are proposed at National Register eligible dams, cultural reviews of the projects would be performed under Section 106 of the NHPA. Consultation response from Washington OAHP is contained in Appendix I. Oregon SHPO has expressed not to expect response correspondence for routine matters.

Federal Insecticide, Fungicide, and Rodentcide Act (FIFRA). (7 USC 136)

FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The EPA is responsible for implementing and enforcing FIFRA. All pesticides, if used, would be registered with the EPA, and State Department of Washington or Oregon, as applicable. The pesticides would be used as stipulated by the label procedures. The program does not currently use any pesticides.

Investigational New Animal Drug (INAD). (21 CFR Part 511)

The FDA grants permission to use INAD. Alpha-chloralose is classified as an INAD and cannot be purchased from any source except APHIS-WS. The FDA authorization allows APHIS-WS to use alpha-chloralose to capture geese, ducks, coots, and pigeons.

FDA's acceptance of additional data would allow APHIS-WS to consider requesting expansion for the use of alpha-chloralose for other species. The program does not currently use any INADs.

Columbia River Gorge National Scenic Area Act. (PL 99-663)

On November 17, 1986, Congress established the Columbia River Gorge National Scenic Area (CRGNSA) as a Federally recognized and protected area. The Act also created a bi-State Columbia River Gorge Commission and directed the Commission and the USFS to jointly develop a management plan, which included a mandate to protect and provide for the enhancement of the scenic, cultural, recreational, and natural resources of the scenic area. This act applies to the area of the Columbia River between its confluences with the Sandy and Deschutes Rivers. The Bonneville and The Dalles dams, as well as the truck aboard barge release location, are located within the CRGNSA and are zoned as Urban and therefore are not subject to regulation by the Gorge Commission. The barge release site is near the borderline between urban and general management zones. The proposed project would not include any specific actions that would be incompatible with the scenic area management plan. Therefore, the project would be in compliance with the Act.

Resource Conservation Recovery Act (RCRA). (42 USC 6901 et seq)

RCRA gives the EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes. No hazardous materials would be used, discarded or produced by this proposed project. Any pesticides, if used, would be used and disposed of in accordance with applicable requirements.

Noise Control Act. (42 USC 65)

The purpose of the Noise Control Act is to establish a means for effective coordination of Federal research and activities in noise control, to authorize the establishment of Federal noise emission standards for products distributed in commerce, and to provide information to the public with respect to noise emission and noise reduction characteristics of those products. The proposed project would generate infrequent noise in the form of sporadic gunshots or auditory deterrents such as pyrotechnic hazing. This noise would not violate any local, State, or Federal noise regulations.

Clean Water Act (CWA), as amended. (33 USC 1251 et. seq)

The CWA sets national goals and policies to eliminate discharge of water pollutants into navigable waters, to regulate discharge of toxic pollutants, and to prohibit discharge of pollutants from point sources without permits. The only proposed project discharge of foreign material into the water would be a minimal amount of steel shot, which would not affect water quality parameters. If pesticides were to be applied, for example tactile, chemosensory or physiological deterrents, prior approval from the various regulatory agencies would be obtained prior to use, as necessary.

Clean Air Act (CAA), as amended. (42 USC 7401, et seq.)
The CAA establishes a comprehensive program for improving and maintaining air quality throughout the United States. The proposed actions would comply with the Clean Air Act. The only source of emissions from the proposed project would be de minimis smoke from infrequent gunshots or auditory deterrents such as pyrotechnic hazing.

Coastal Zone Management Act (CMZA) of 1972. (16 USC 33) The CMZA requires that all Federally conducted or supported activities directly affecting the coastal zone must be undertaken in a manner consistent to the maximum extent practicable with approved State coastal management programs. The action area is outside the coastal zone. Therefore, the preferred alternative would have no affect on the coastal zone of Oregon or Washington States, and statements of concurrence are not required.

National Historic Preservation Act, As Amended. (16 USC 470-470t, 110) As required under Section 106 of the National Historic Preservation Act, the Corps is coordinating with the Washington OAHP and Oregon SHPO. A report describing these findings will be submitted to the OAHP and SHPO for their review. The Corps has determined that the construction of this project would have *no effect* on known cultural resources located in the proposed project area (see Appendix E). The Corps requested concurrence with the determination from the OAHP and SHPO. The OAHP reviewed and concurred with the project report (see Appendix I).

Environmental Justice (EO-12898) EO-12898 includes guidelines for all Federal agencies to evaluate activities to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low-income populations to a greater extent than the general population. Because the management tools proposed would not pose significant risk to humans or their environment, it is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income populations. Also, the species targeted are not a food or income resource for the region's minority or low-income populations.

Federal, State and Local Permits
The actions within the Corps' program has been implemented by APHIS-WS, who obtain a USFWS Federal Fish and Wildlife permit for management activities that involve the taking of migratory species in Washington State and part of Oregon State. A 6-month renewable permit was issued 1/01/01 (under CFR 50 part 13 requirements). USFWS is in the process of issuing a new predation permit to APHIS-WS for its management activities on the Lower and Mid-Columbia and Lower Snake Rivers.

A water quality standard modification, if required, would be requested from the appropriate State agency, if pesticides were to be applied to the water.

Recreation Resources
The proposed project would not affect Wild and Scenic Rivers, National Trails, Wilderness Areas, National Parks, or other specially designated recreational areas.

6.0 CUMULATIVE EFFECTS

Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Under the current program, the Corps, with the assistance of APHIS-WS, addresses damage to piscivorous birds associated with the dams. APHIS-WS is the primary Federal agency with wildlife damage management responsibilities.

6.1 Past Actions

Hydroelectric dam development changed the Columbia River basin from mostly free-flowing rivers beginning in 1933 to a series of dams and impoundments by 1975. The reservoirs that formed behind some dams created islands that were ideal for piscivorous bird colonization. Water released below the dam created unnatural food source conditions for these birds. Some bird species have increased in abundance and their current populations are much higher than they were historically, sometimes to the detriment of weakened salmon populations (Federal Caucus 2000).

Depredation

Depredation is the authorized killing, under a permit, of mammals or birds that might otherwise be protected by law. Permittees are required to submit an annual report of activities to the USFWS each calendar year from the issue date of the permit. Table 6.1 below, summarizes the 6 year average take per year (FY1997-2002) and range (low-high) of these Federally-issued Washington depredation permits for bird species relevant to this EA (USFWS 2002). These figures include permits issued for research and wildlife damage management.

Table 6.1. Average Take and Range of Piscivorous Species Lethally Removed in Washington State under USFWS Depredation Permit (FY1997- 2002)

	Average take per year	Range (low-high)
California gull:	1,869	94 – 3,245
Ring-billed gull:	6,228	30 – 11,604
Herring gull:	253	40 – 543
Double-crested cormorant:	715	6 – 1,347
Caspian tern[1]:	397	1 – 1,069
Great-blue heron:	141	0 – 292
Common Merganser[2]:	223	0 – 388

[1] In addition, approximately 730 viable Caspian tern eggs were removed by WDFW in Commencement Bay, WA in 2001 under a general scientific collecting permit.
[2] Prior to 2001, there was not a separate MIS code for common mergansers. Instead, they were recorded and "Merganser, Other."

Effects of Lead Shot

Because shooting is one component of the proposed program, the deposition of lead shot in the environment is a potential factor considered in this EA. Threats of lead toxicosis to waterfowl and other wildlife from the deposition of lead shot in waters where such species fed were observed more than one hundred years ago (Sanderson and Bellrose 1986). As a result of discoveries made regarding impacts to several species of ducks and geese, Federal restrictions were placed on the use of lead shot for waterfowl hunting in 1991. Regulations regarding this are found in 50 CFR 20.21.

Steel shot is used on Corps facilities during APD management activities. Consequently, deposition of lead in nontoxic shot zones does not occur as a result of these activities. Therefore, no cumulative impacts are expected related to lead toxicosis and shooting as a tool.

Caspian Tern Relocation Efforts

A pilot study was conducted in 1999 to test the feasibility of colony relocation as a method to reduce the magnitude of Caspian tern predation on juvenile salmonids. Using habitat modification and social attraction (i.e., tern decoys and audio playbacks) to encourage nesting on East Sand Island and grass planting, fencing, and harassment of terns to discourage nesting on Rice Island, approximately 1,400 nesting pairs were relocated from Rice Island to East Sand Island in 1999. Terns nesting on East Sand Island consumed approximately 40% fewer juvenile salmonids compared to terns nesting on Rice Island, presumably due to the proximity of East Sand Island to marine habitats. Based on these results, regional fish and wildlife managers decided to pursue a management plan to relocate all Caspian terns nesting on Rice Island to East Sand Island. See Appendix A, Plate 2 for island locations.

In 2000, the management plan sought to prevent all nesting by Caspian terns on Rice Island and to attract all the terns that formerly nested at Rice Island to 4 acres of tern nesting habitat on East Sand Island. However, a court-ordered restraining order precluded passive and active harassment at Rice Island, and some of tern nesting did occur on Rice Island in 2000.

Most terns did relocate to East Sand Island, however, resulting in about 8,500 pairs nesting there, for a total estuary population of about 9,100 breeding pairs. This relocation resulted in an estimated 4.4 million fewer smolts being consumed by estuary terns in 2000 than in 1999. Terns consumed about 6.1 to 8.6 million smolts in 2000 (Columbia Bird Research 2002). In 2001 and in 2002 the entire colony nested on 3.9 and 4.5 acres, respectively, on East Sand Island. Terns did not nest on Rice, Miller, Sands or Pillar Rock in 2002. There were about 9,000 breeding pairs of terns in 2001 and over 9,900 pairs in 2002 (Columbia Bird Research 2002).

A court settlement from the U.S. District Court for the Western District of Washington, signed April 2, 2002, requires the defendants (Corps and USFWS) to prepare an interim EA addressing management actions pending completion of a Caspian tern management plan/EIS. The settlement requires the creation of at least 6 acres of suitable tern habitat on East Sand Island, and allows harassment of terns on Rice, Miller, Sands and Pillar Rock Islands, up until nesting season. Development of a management plan/EIS for management of Caspian terns in the Columbia River Estuary is required by the settlement. The USFWS, assisted by the Corps and NMFS, is required to have a completed plan/EIS by February 2005. Completion of three documents is also required to develop the plan/EIS:

1) Avian predation analysis to determine levels of predation that do not impede salmon recovery (completed by NMFS in September 2002);
2) Status Assessment of Caspian terns (completed by USFWS in August 2002) and
3) Feasibility study of potential Caspian tern nesting sites in the Pacific Northwest.

The USFWS Caspian Tern Site Feasibility Assessment (Seto et al. 2003) reported there was no management potential on the Mid-Columbia River islands because it would not reduce Columbia River impacts. As a result of the relocated tern colony in the Columbia estuary, juvenile salmon take in 2002 was reduced 67 percent from an estimated 18 million to 6 million. (http://www.columbiabirdresearch.org/)

6.2 Present and Reasonably Foreseeable Future Actions

Use of Avicides

The avicide, DRC-1339 Concentrate – Gulls, registered by the EPA (EPA #56228-17) is the only foreseeable chemical that would be used in this program for the purpose of obtaining lethal effects on gulls. The use of DRC-1339 has been analyzed with regard to migratory birds in Washington State (USDA 2001 and USDA 1997, revised). This chemical has been evaluated for possible residual effects that might occur from the buildup of the chemicals in soil, water, or other environmental sites. DRC-1339 exhibits a low persistence in soil or water, and bioaccumulation of the chemical is unlikely (USDA 1997, revised). The USFWS has concurred that the use of DRC-1339 in Washington States is not likely to adversely affect Federally-listed bird species (USDA 2001).

Based on use patterns, chemical and physical characteristics of avicides used in Washington State, and factors related to the environmental fate of DRC-1339, very low or negligible impacts would be expected from the potential use of DRC-1339, if used to reduce immediate threats of gull predation to ESA-listed juvenile salmonids.

Additional Relocation Efforts

The Caspian tern population at Crescent Island (upstream of McNary) is increasing. More than 12,000 PIT tags were found on Crescent Island in 2002. This represented a minimum mortality rate of 9.7% for steelhead and 1.5% for yearling Chinook for research fish leaving Lower Monumental Dam (Muir, et. al 2003). This data indicate a very high juvenile salmonid "take" by the Caspian Tern population on Crescent Island. See Appendix A Plate 2 for islands used for avian nesting.

Crescent Island is Federal property that the Corps administers and currently leases to USFWS. Future translocation efforts are a foreseeable action that would involve habitat modification similar to that undertaken at Rice Island. Because habitat modifications have the potential to affect both target and non-target species, any translocation project would be evaluated and any additional separate NEPA documentation needed would be prepared.

Expansion of Exclusion Systems at Dams

Under the preferred alternative, there are plans to increase the exclusion system coverage at several dams by moving the attachment points and wires to protect unprotected juvenile bypass outlets and tailrace area. See Table 2.2 for locations and descriptions of proposed exclusion system expansion. Expansion of exclusion systems on other non-Corps operated dams on the Columbia River system is a foreseeable action with anticipated beneficial cumulative impacts.

Actions by Others

It is reasonable to expect if governmental assistance in resolving wildlife conflicts were to decrease, impact to others may increase and controlled actions may decrease. A controlled program is seen as having a positive cumulative impact.

The management of piscivorous bird damage for the five publicly owned hydroelectric dam and hatcheries on the Mid-Columbia River was evaluated (USDA 2003), and made a FONSI determination. The dams on the Lower Columbia and Lower Snake Rivers, in contrast, are Federally-operated by the Corps of Engineers. Both entities are action agents, with responsibility to perform environmental assessments for their own projects and programs. They each receive separate funding to implement their programs. Separate environmental documentation has been prepared, with each including the other in its cumulative effects section. USDA Animal and Plant Health Inspection Service / Wildlife Services (APHIS-WS) has performed, under contract, APD Program services for both agencies.

6.3 Summary

The scope of this proposal and the number of piscivorous birds that might be adversely affected under any of the alternatives carried forward would result in very low or negligible direct or indirect impacts. Cumulative impacts of public actions to control piscivorous birds to reduce avian predation can only be projected based on the best information available. Despite recent efforts taken to reduce damage by target species in specific locations and circumstances, regional and national populations for gulls, Caspian terns and double-crested cormorants have remained healthy. The Corps will maintain ongoing contact with APHIS-WS, USFWS, NMFS, ODFW, and WDFW to ensure local, state and regional knowledge of wildlife management objectives concerning the preferred alternative.

The proposed program, taken together with other past, present, and reasonably foreseeable future actions would have a very low or negligible impact on non-target, sensitive, and protected species (see also the EA Piscivorous Bird Management for the Protection of Juvenile Salmonids on the Mid-Columbia River (USDA 2003), Management of Damage Caused by Migratory Birds in the State of Washington EA (USDA 2001), and the Animal Damage Control Program Programmatic EIS (1997, revised).

7.0 PREFERRED ALTERNATIVE

The Non-Lethal Tools Only (Alternative 2) is the preferred alternative and is discussed in Section 2.2 in further detail.

The preferred alternative consists of using:

- APHIS-WS and/or other qualified technical assistance;
- All practical and effective non-lethal control methods;
- New NWRC and/or other agency approved wildlife damage management tools developed through research that can be evaluated for inclusion into the Corps program.

Tools for Use under Alternative 2:

- Visual Deterrents
- Auditory Deterrents
- Exclusion

Tools that are Available, but not Currently Used:

- Tactile Repellents
- Chemosensory and Physiologic Repellents
- Habitat Modification
- Translocation
- Contraceptives
- Egg Addling
- Avicides

This EA has been prepared in compliance with NEPA and no significant impacts have been identified to date. If no significant impacts are identified during the public review process, an EIS will not be required. Full compliance with NEPA would be achieved once a FONSI is signed.

8.0 PREPARERS, REVIEWERS, AND ENTITIES CONTACTED/CONSULTED

8.1 Reviewers and Preparers

<u>Corps of Engineers</u>

Walla Walla District	**Portland District**
Stan Heller NWW	Lynne Hamilton NWP
Ben Tice NWW	Calvin Sprague NWP
Dave Hurson NWW	Gary Johnson NWP
Rex Baxter NWW	Robert Cordie NWP
Mark Plummer NWW	

<u>USDA APHIS</u>

Jason Gibbons, Wildlife Biologist
Shannon Hebert, Environmental Coordinator
Michael Linnell, Assistant State Director WA/AK
Roger Woodruff, State Director WA/AK

8.2 Entities Contacted, Consulted, and/or Coordinated

United States Fish and Wildlife Service (USFWS)
National Marine Fisheries Service (NMFS)
Oregon Department of Fish and Wildlife (ODFW)
Washington Department of Fish and Wildlife (WDFW)
Northwest Power Planning Council (NPPC)
Columbia River Intertribal Fish Commission (CRITFC)
Confederated Tribes of the Umatilla Indian Reservation (CTUIR)
Nez Perce Tribe
Confederated Tribes of the Colville Reservation
Confederated Tribes and Bands of the Yakama Indian Nation
Confederated Tribes of Warm Springs
Cowlitz Indian Tribe

APPENDIX A

PLATES

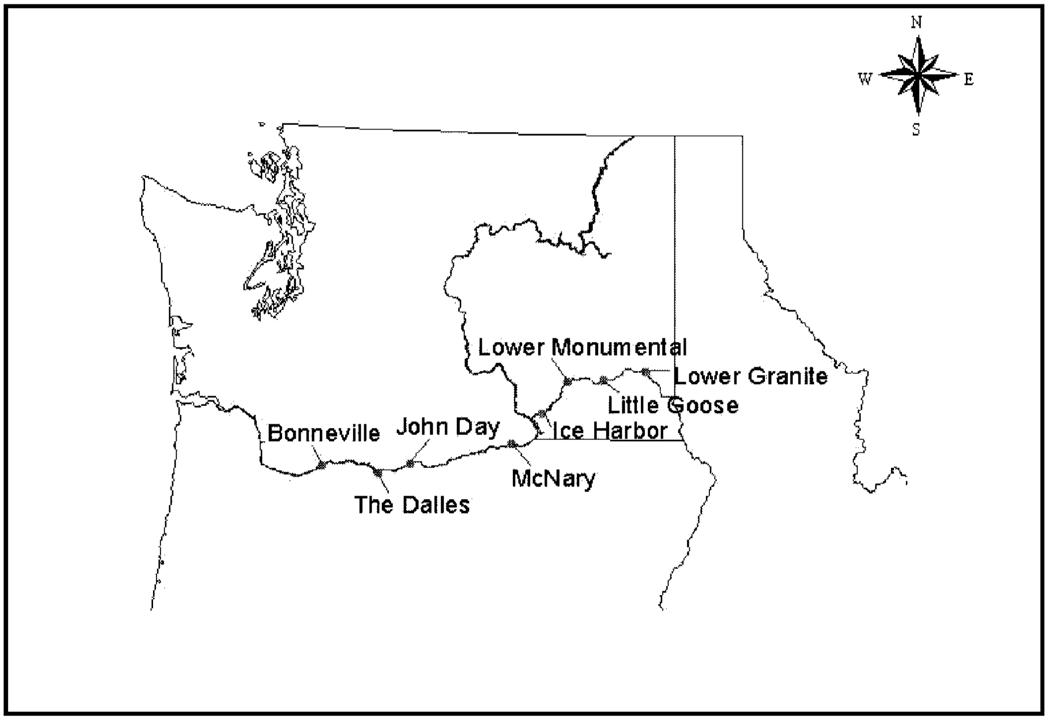


Plate 1 – Project Locations Map

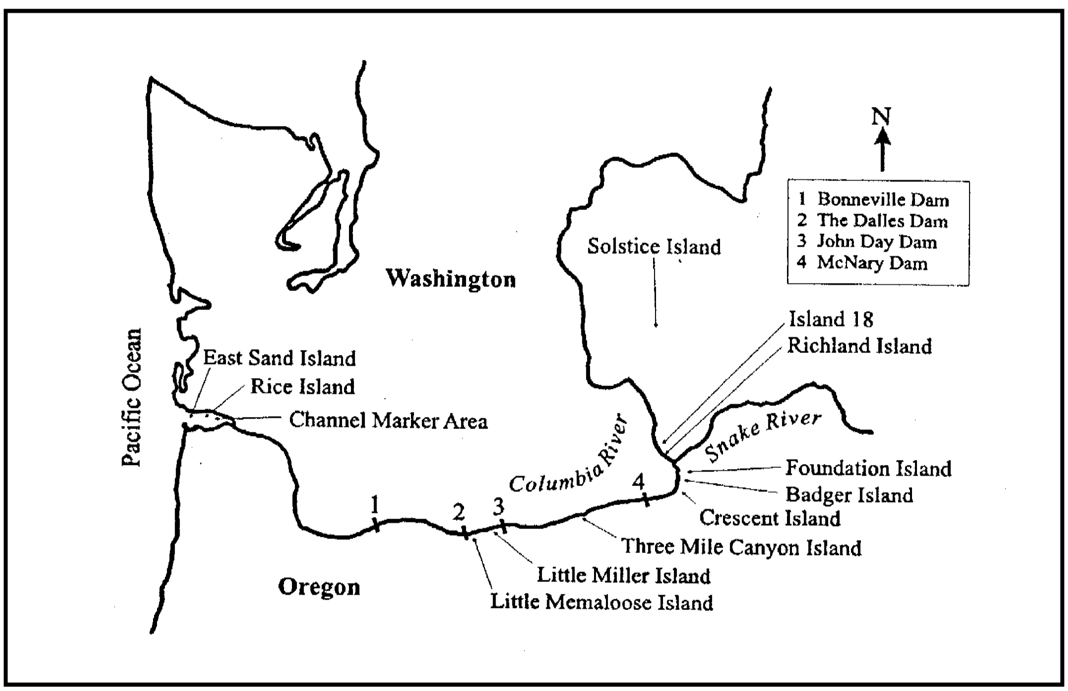
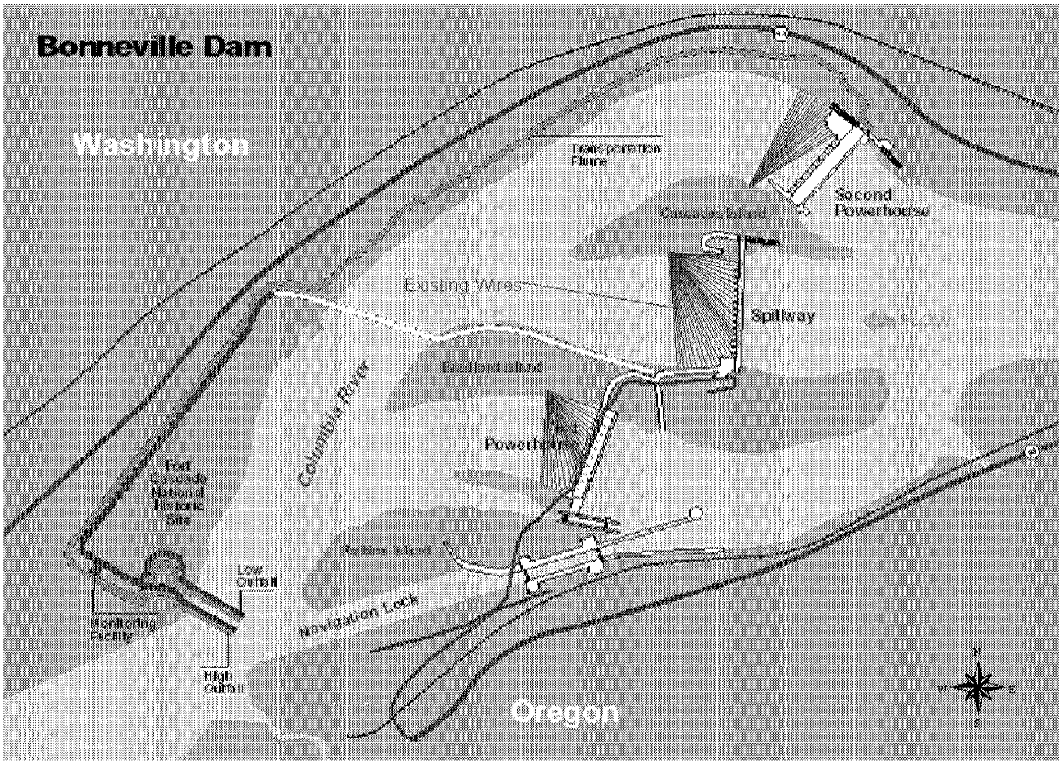
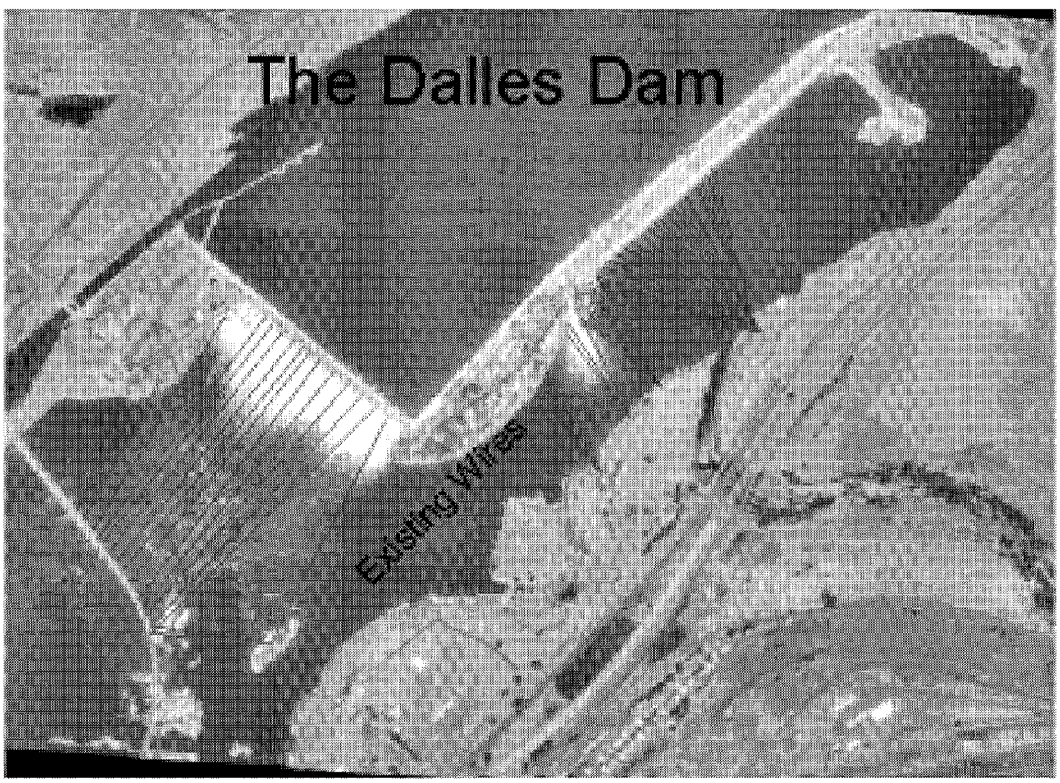


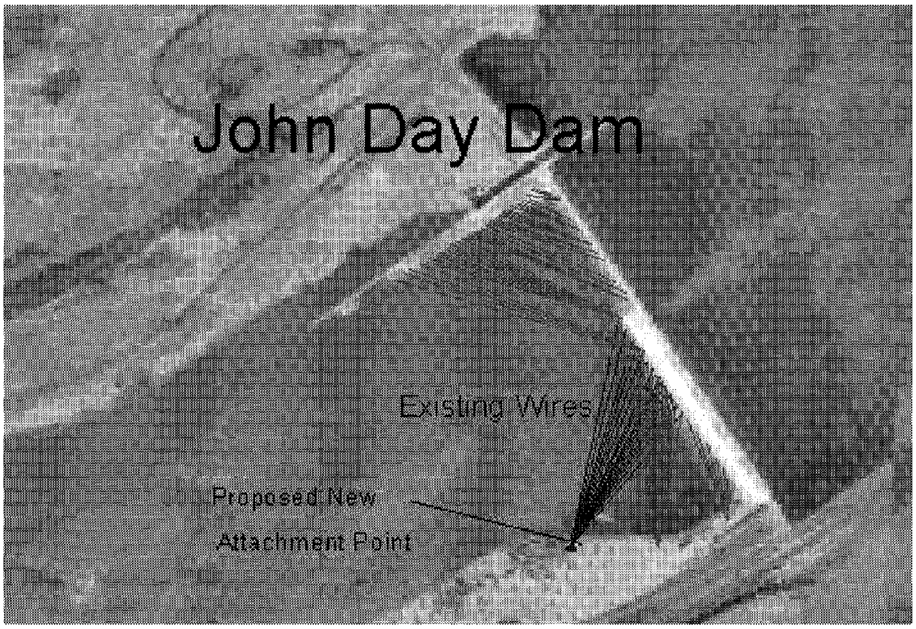
Plate 2 – Locations of Avian Nesting Areas in the Columbia River Basin

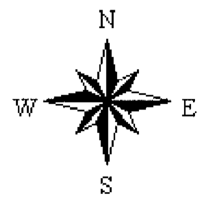


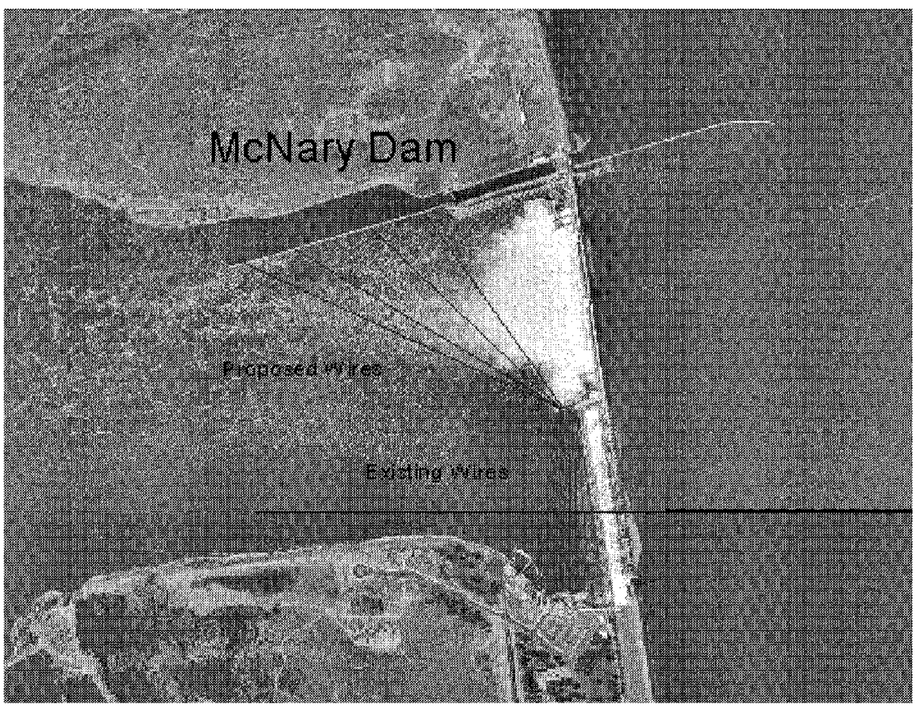


Existing Wires
Proposed Wires

Plate 3 – Bird Exclusion Systems; existing and proposed at Bonneville and The Dalles Dams



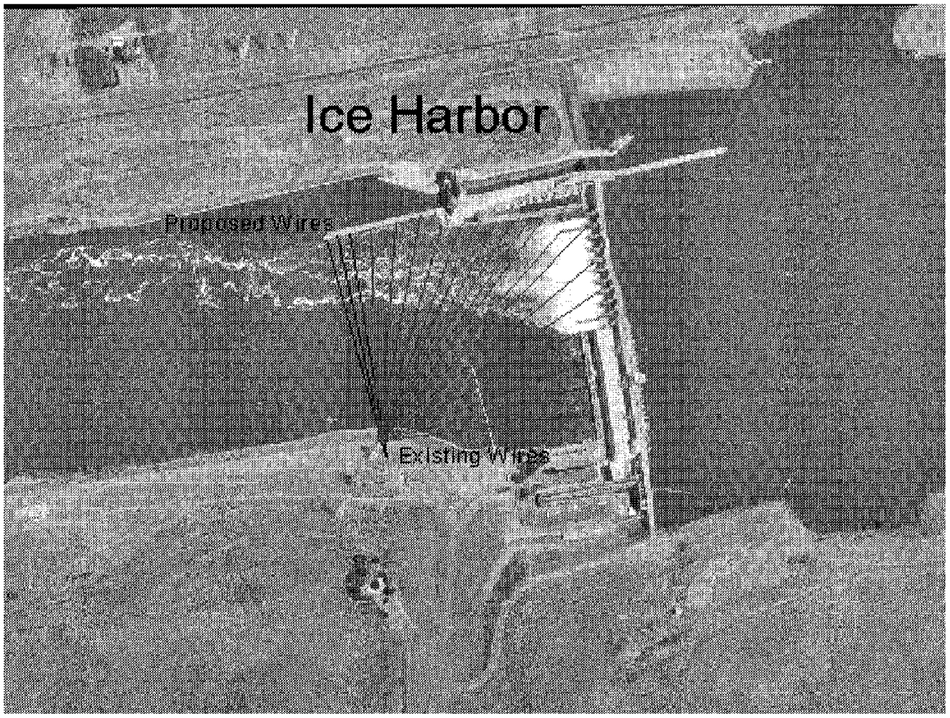


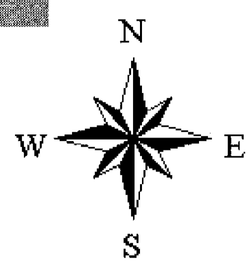


Existing Wires

Proposed Wires

Plate 4 – Bird Exclusion Systems; existing and proposed at John Day and McNary Dams





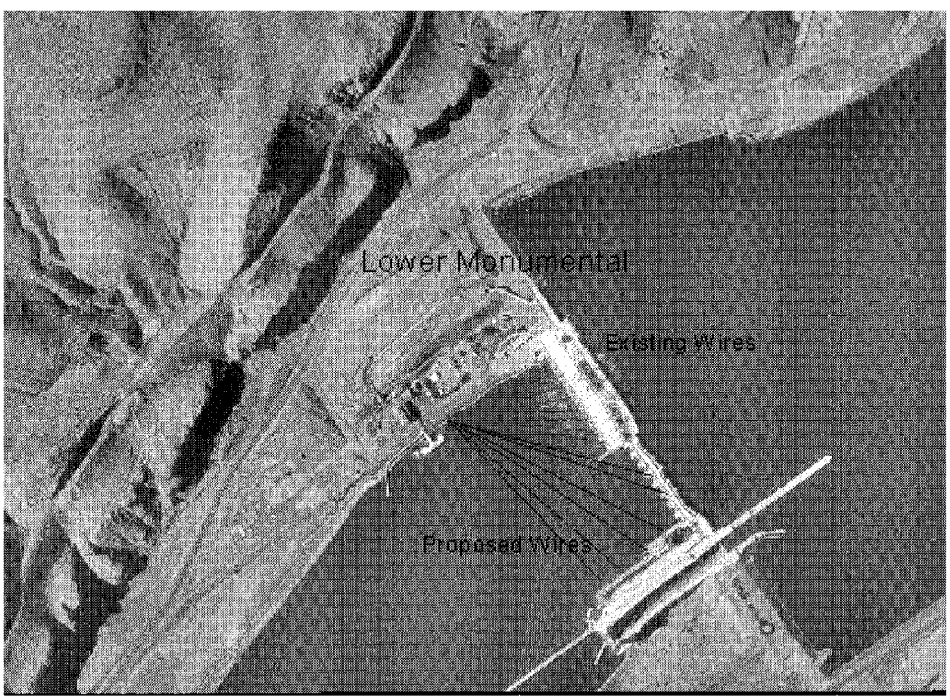
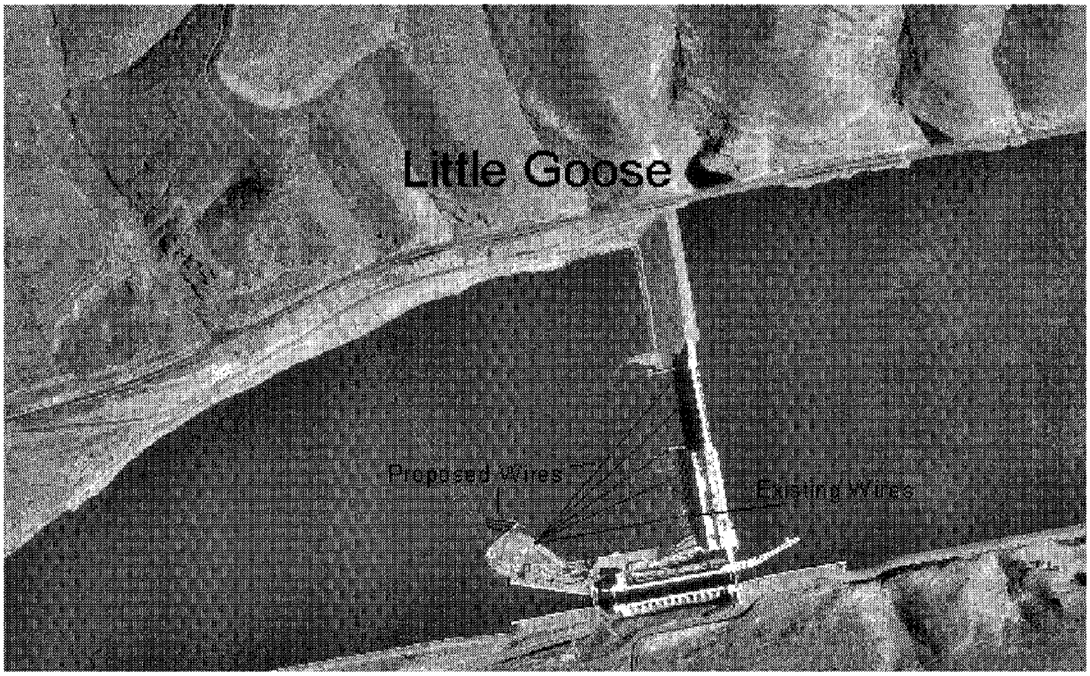
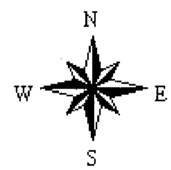


Plate 5 – Bird Exclusion Systems; existing and proposed at Ice Harbor and Lower Monumental Dams





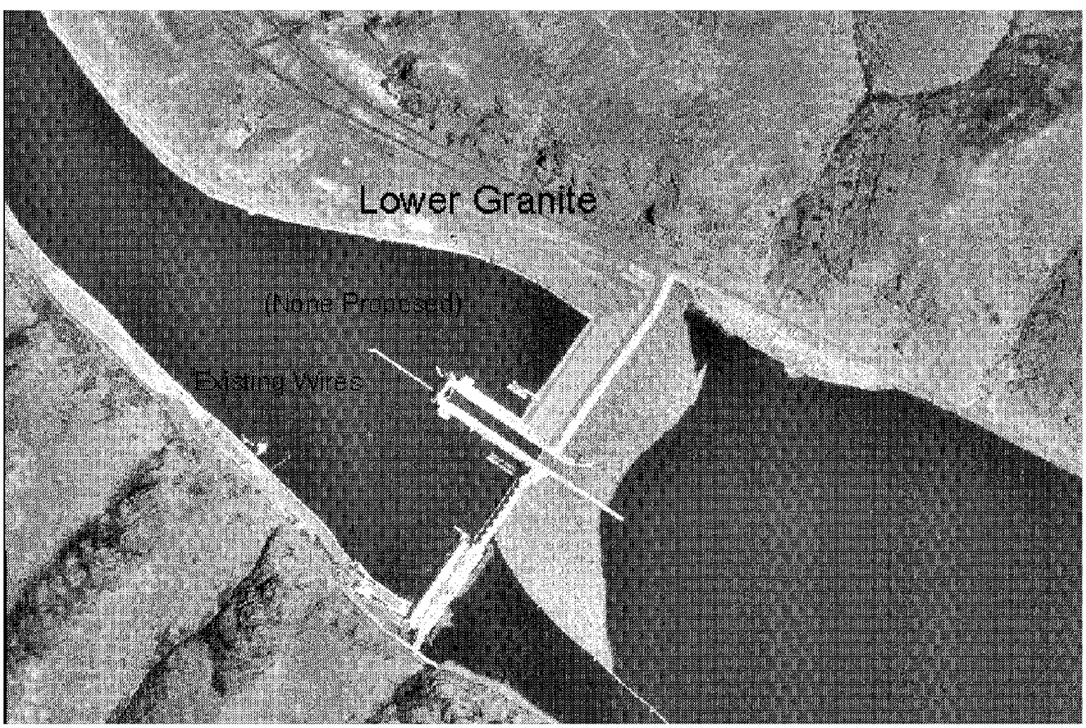


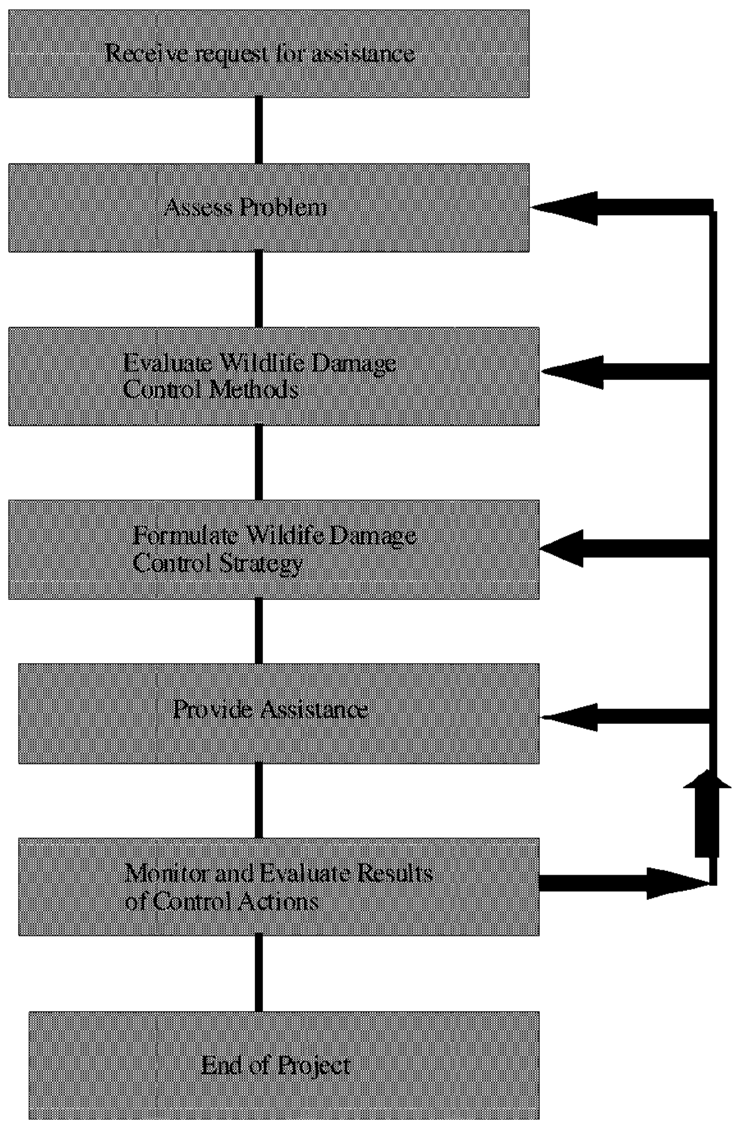
Plate 6 – Bird Exclusion Systems; existing and proposed at Little Goose and Lower Granite Dams

APPENDIX B

APHIS-WS DECISION MODEL

APHIS-WILDLIFE SERVICES DECISION MODEL

The decision making process must be predicated on consideration of the specific biologic, socio-cultural, economic, physical, and other environmental circumstances associated with a given wildlife damage problem.



APHIS ADC Decision Model

(USDA-APHIS-ADC Programmatic EIS, Chapter 2)

(all references to figures, tables and appendices pertain to the EIS, USDA 1997)

APHIS ADC personnel receive requests for assistance that encompass the broad range of wildlife damage problems. Some requests are relatively simple with straightforward solutions. Excluding squirrels from bird feeders or raccoons from chimneys represent typical examples. Requests for assistance to protect endangered species or human safety at airports are examples of more challenging problems in which a high level of interest is shown by various groups, organizations, and agencies. Unlike the previous squirrel and raccoon examples, the formulation, implementation, and success of an IPM strategy is frequently contingent on highly coordinated and cooperative efforts with many parties.

Each request for assistance is unique regardless of its complexity. Therefore, the decision-making process must be predicated on consideration of the specific biologic, socio-cultural, economic, physical, and other environmental circumstances associated with a given wildlife damage problem. Ideally, a variety of methods should be available for the decision-maker to formulate an effective IPM strategy (Table 2-4). Access to a variety of methods allows field personnel greater flexibility and a better opportunity to formulate an effective strategy for each specific request for assistance.

The decision-making steps APHIS ADC personnel take are fundamentally the same as those described in Chapter 1 for other professionals (Figure 1-1). The APHIS ADC decision model presented in Figure 2-4 is a more detailed version of the general professional action model (Figure 1-1) that was specifically developed to depict the APHIS ADC decision process. The compartment entitled “Evaluate Wildlife Damage Control Methods” from the APHIS ADC decision model (Figure 2-4) has been expanded to show the important factors given consideration at this step (Figure 2-5). The APHIS ADC decision model can be applied to the other program alternatives. Control methods selected under each alternative could be screened and evaluated leaving the wildlife manager with the best solution under the constraints of the alternative. Some methods available for evaluation and consideration in the formulation of control strategies are listed in Table 2-4. Representative, detailed examples of types of requests for assistance received by the APHIS ADC program have been developed to further demonstrate some of the complexities of formulating effective IPM strategies (Appendix N). The reader is encouraged to refer to these specific examples to gain a better understanding of the APHIS ADC decision process.

All Federal actions are subject to NEPA (PL 91-190, 42 U.S.C. 4321 et seq.). APHIS ADC complies with CEQ regulations implementing NEPA (40 CFR 1500 et seq.) and the APHIS Implementing Guidelines (7 CFR 372) as part of the decision-making process. The relationship of the NEPA process to APHIS ADC decision-making is shown in Figure 2-6.

Wildlife damage decision models can be useful management tools (Schmidt et al. 1985). They can serve as meaningful communication instruments as well. The decision model presented in Figure 2-4 is designed to serve as both these functions; however, it necessarily oversimplifies complex thought processes.

Receive Request for Assistance

APHIS ADC is a service-oriented program that works on a request basis. Requests may be received by phone, in person, as referrals from others, or a variety of other means. Requests for assistance encompass a broad range of wildlife conflicts from nuisance wildlife in urban structures to more intricate problems, such as wildlife hazards to public safety, predation of livestock, or protection of endangered species.

Assess Problem

Each request undergoes an initial assessment to determine if the problem is within the purview of APHIS ADC. Requests determined to be within the purview of APHIS ADC are subjected to a detailed assessment of the damage.

a) Purview Determination

The diversity and scope of activities conducted by the APHIS ADC program is defined by Federal, State, and local laws, as well as MOUs and agreements. The purview of APHIS ADC varies among the 50 States in which the program is administered as a consequence of differences in State and local laws, MOUs, and agreements established with the APHIS ADC program in each State.

Most requests involving wildlife damage to agriculture, facilities and structures, or natural resources, or if wildlife poses a threat to public health and safety, result in APHIS ADC providing some type of wildlife damage management assistance. Requests to address problems that are clearly not within the responsibility or authority of the program in a State are usually referred to an appropriate source of assistance as a professional courtesy.

b) Detailed Assessment of Damage

In assessing the damage, immediate attention is given to confirming that damage was caused by vertebrate animals, the species responsible for damage, and the type of damage (e.g. bird hazard at an airport, loss of livestock, or flooded crops). Commonly this requires an inspection, depending on the type and complexity of the problem. Then severity of the problem is considered in deciding which management options are potentially applicable. During inspections, damages normally are confirmed by APHIS ADC personnel.

The extent and magnitude of damage is also important in assessing current and potential economic losses in the absence of control. The resource manager or affected party is usually the source of this type of information. Pertinent aspects of the damage history are also relevant. For example, is this a recurring problem or is it the first episode of this type? What control actions, if any, have been attempted by the resource manager or affected party? What were the results? If no further control action is taken, is damage likely to continue or recur?

Evaluate Wildlife Damage Control Methods

Once the problem assessment is completed, all available methods are evaluated for their practicality. Conceptually, this component of the APHIS ADC decision model consists of a series of legal, administrative, and environmental screens for each potential method (Figure 2-5). The result of this evaluation is one or more methods practical for further consideration in formulating alternative wildlife damage control strategies (see "Formulate Wildlife Damage Control Strategy" on p. 2-32).

A list of control methods for the 17 representative target species (analyzed in detail in Chapter 4) is provided in Table 2-4. To facilitate an understanding of the relative availability of control methods and who generally applies them, methods are organized under three action approaches to managing wildlife damage problems (Table 2-4).

One action approach is management of the resources susceptible to damage. It includes those activities designed to improve or modify current resource management practices, such as husbandry and cultural practices, as well as modification of human behavior. Application of these methods typically is the responsibility of the resource manager or affected party. However, APHIS ADC personnel make technical assistance recommendations concerning these methods.

A second action approach is placement of physical barriers to separate the resource that has sustained or is susceptible to damage from specific wildlife species. Fences, nets, and wire grids are examples of physical barrier methods. Like resource management methods, these are usually applied by the resource manager or affected party. APHIS ADC often makes technical assistance recommendations concerning the installation and improvement of physical barrier methods to reduce wildlife damage. APHIS ADC may also loan materials or demonstrate fencing or other physical exclusion methods.

A third approach, management of wildlife, includes habitat management, modification of wildlife behavior, and wildlife population management to reduce damage. Habitat management includes activities such as thinning trees from bird roosts or water level manipulation through removal of beaver dams, and is normally implemented by the resource manager or affected party. Modification of wildlife behavior includes the use of frightening devices, repellents, or lure crops. Population management includes translocation or lethal removal of wildlife from local populations. Behavior and population management methods may be conducted by either the resource manager, APHIS ADC personnel, or other wildlife damage control professionals, depending on legal and administrative considerations in each locale.

a) Legal and Administrative Considerations

Wildlife damage control methods are subject to legal and administrative authorities. For example, a method may be legal in one State and not another. Or, a method may be legal only in portions of a State (e.g. not allowed in heavily populated areas). The status of the target species (State or Federally listed as threatened or endangered), or the presence of listed species in the general area where control activities are proposed, may preclude the use of a method. The species may be a migratory bird, requiring a depredation permit in order to implement specific types of control actions. Also, the APHIS ADC program itself may restrict the use of specific methods by policy or agreement with other agencies or parties. Important questions that should be considered for each method during this phase of the assessment include:

- Is it legal, and administratively permissible to use the method on this species within the State where the request for assistance has been received?
- Is it legal, and administratively permissible to use the method to address this specific type of damage?
- If so, is it legal, and administratively permissible to use this method at the specific site for this request for assistance, or are there restrictions because of land class, other land use patterns, or the presence of listed species near the damage site?

All of the methods that pass these legal and administrative screens are available for further consideration in the decision process. It should be noted, however, that there are additional legal considerations with regard to who may apply (resource manager or affected party, APHIS ADC personnel, or others with expertise in wildlife damage management) methods considered under “Formulate Wildlife Damage Control Strategy” (see p. 2-32)

b) Environmental Considerations

During this phase of the assessment, each legally and administratively available method is evaluated with regard to pertinent aspects of the biological, physical, socio-cultural, and economic environments. A general question to be considered is: What are the positive or negative short or long-term direct, indirect, or cumulative environmental effects of implementing or not implementing control action with the method? Other important questions that should be considered in making decisions about each method are listed below.

1) Biological Environment

- What is the population status of the target species? Is it endangered or threatened; or is it relatively abundant?
- Are there any threatened or endangered or other potential non-target species in the area that could be affected either directly or indirectly in a positive or negative fashion by using the method?
- Are there any special behavioral traits of the target species, such as daily or seasonal movement patterns, that require consideration?
- Could the use of the method potentially affect biological diversity?

2) Physical Environment

- What effect would local weather or climatic patterns have on the use of the method?
- What effect would soil, water, air, elevation, or other physical habitat features have on the use of the method?
- What effect would the method have on soil, water, and air quality?
- What health and safety risks would the method pose to the applicator and the public?
- What health and safety risks would be posed to the public by not conducting control using the method?

3) Economic Environment

- Would the use of the method in this situation be likely to reduce damage?
- Does the magnitude of damage warrant the cost of applying the method?

4) Socio-cultural Environment

Evaluating methods in the socio-cultural environment frequently presents the greatest challenge because of differences in human attitudes toward wildlife species (Kellert 1976; Decker and Goff 1987), wildlife damage management methods (Stuby et al. 1979; Arthur 1981), and the resources damaged by wildlife (Connolly 1982). In spite of the difficulties associated with evaluating methods in the socio-cultural environment, societal values are important in decision-making and they deserve similar consideration in methods evaluation as the other environmental factors. Some important socio-cultural issues to consider in evaluating wildlife damage control methods include:

- What are the perceptions regarding the humaneness of the method?
- How acceptable would the risks of this method to non-target animals be to the resource manager or affected party and the general public?
- How acceptable is the effect of each method on the target animal–no effect, frighten, exclude, modify habitat, translocate, or kill–to the resource manager or affected party and the general public?

The methods evaluation should result in one or more methods available for further consideration in formulating a control strategy (Figure 2-5). However, as a function of this evaluation it is possible to determine that there are no practical methods available. This results in no action being recommended or taken.

Formulate Wildlife Damage Control Strategy
At this decision step, those control methods determined to be practical from the previous evaluation are formulated into a control strategy for the specific problem. In determining the sequence or combination of methods to be applied and who will apply them, preference is given to practical non-lethal methods. However, this does not mean that non-lethal methods must always be applied as a first response to each damage problem. Often the most appropriate response is a combination of non-lethal and lethal methods, and there will be instances where application of lethal methods alone is the most appropriate strategy.

a) Strategy Considerations

1) Available Expertise
As previously discussed, some control methods are usually applied by the resource manager or affected party. Other methods can be used by resource managers or other professional wildlife damage control personnel, and still others may only be applied by APHIS ADC personnel.

The availability of expertise to address each specific request for assistance may influence the balance of technical assistance and direct control activities when formulating the IPM strategy. Relatively simple damage problems may be adequately addressed through technical assistance. However, effective solutions to many damage problems require an integration of those methods used by the resource manager with direct control services provided by the APHIS ADC program or other professional wildlife damage managers. The availability of APHIS ADC expertise for direct control to address complex damage problems is dependent on cooperative or congressionally directed funding. Cooperators are generally more inclined to provide funding for problems requiring special expertise than for those problems they can either solve on their own or through technical assistance. In addition, Federal and State legislators are more likely to appropriate public funds to solve problems requiring special equipment, materials, and expertise.

2) Legal Constraints on Method Users
Screening was previously performed (see "Legal and Administrative Considerations" on p. 2-30) to determine which methods were legally and administratively permissible for this problem. It is necessary here to consider any additional legal constraints on methods that define who may apply each method. The avicide DRC 1339, for example, can be used only by USDA personnel trained in bird damage control or persons under their direct supervision. Use of the livestock protection (LP) collar is restricted to specially trained and certified LP collar applicators that may be APHIS ADC employees (see Appendix Q).

3) Cost
Cost effectiveness is an obvious goal in wildlife damage management. However, the costs of implementing wildlife damage management cannot be considered independently from the damage problem, probable environ-mental impacts, and other strategy considerations.

The costs of methods and their application should be weighed against the severity of damage. Even in cases involving serious damage, lack of funds may constrain the resource manager or affected party from hiring special expertise adequate to solve the problem.

In relatively simple wildlife damage problems, such as excluding squirrels or raccoons from urban structures, the provision of technical assistance is usually sufficient and the least costly means of providing a solution. Difficult wildlife damage problems are usually not as easily or effectively resolved through technical assistance alone. For example, a livestock producer who is using all practical, state-of-the-art resource management and physical barrier methods may also require direct control assistance to successfully constrain continuing losses. In this scenario, the monetary costs for implementing an IPM strategy include both the costs of direct control applied by APHIS ADC and the costs incurred by the resource manager for implementing resource management and physical barrier methods.

Off-site or indirect benefits have to be considered as well. For example, the costs associated with the suppression of an offending coyote population at one location may be relatively high. But when costs are considered in the context of the benefit of avoided or continuing loss of sheep in neighboring areas, the costs of implementing the control strategy may be low.

Overriding social concerns often preclude the use of the most cost-effective methods. The use of pyrotechnic frightening devices in and around developed areas to reduce damage caused by birds may not be recommended or used because of noise, aesthetic, or other social concerns. Safe and effective lethal methods may not be used in a variety of circumstances primarily because of social considerations.

Short and long-term costs and benefits of wildlife damage management strategies also are important. Methods such as the propane cannon have substantially higher initial costs in comparison to pyrotechnics, yet may be less expensive when labor is factored into the strategy budget.

4) Relative Effectiveness of Methods

Subject to other constraints and considerations previously discussed, APHIS ADC personnel attempt to recommend the most effective method or combination of methods to resolve problems. Effectiveness of a method or combination of methods must take into account the variables previously discussed, such as legal and administrative availability and practicality, as well as their monetary costs, negative environmental impacts, and most importantly their ability to reduce damage. Ideally, a method or combination of methods should be selected that produces maximum damage resolution with minimal negative environmental impacts (Owens and Slate 1991).

Provide Assistance

APHIS ADC program service is delivered to the public by two basic means: technical assistance and direct control. Technical assistance is the provision of advice, recommendations, information, or materials for use in managing wildlife damage problems. Its emphasis is on helping others help themselves. Technical assistance may require substantial effort by APHIS ADC personnel in the decision-making process, but the actual control activities are the responsibility of the resource manager or affected party. Direct control is the implementation of control activities by APHIS ADC personnel in the field. Direct control is typically provided when funding is available and technical assistance alone is inadequate (see p. 2-17 through 2-20 for a more comprehensive description of technical assistance and direct control). Direct control by APHIS ADC or other appropriately trained wildlife personnel should be employed when actions may affect sensitive species or sensitive areas of the public domain or involve certain hazardous materials (Berryman 1972).

Monitor and Evaluate Results of Control Actions

If control measures have been provided by APHIS ADC, it is usually necessary to monitor control actions to determine if they are achieving the desired results. Return site visits or telephone contacts with the resource manager represent the most common forms of monitoring conducted by APHIS ADC personnel. Site visits or phone contacts are also required to monitor equipment placed in the field by APHIS ADC personnel to assess if it is functioning properly, or to determine if any animals have been captured.

Monitoring control actions is an important step in determining if further assistance is required to responsibly address the problem. Monitoring also allows APHIS ADC personnel to know when to discontinue control activities, thus reducing unnecessary environmental impacts and monetary expenditures.

The need for additional assistance is usually identified through routine monitoring and evaluation of control actions by APHIS ADC personnel. If the recommended strategy is having an effect but damage has not abated, continuation of the strategy or reevaluation may be in order, as represented by the feedback loop shown in Figure 2-4.

End of Project

A project is considered completed for APHIS ADC whenever program personnel are no longer directly involved in control activity for that specific problem. For many projects that are addressed through technical assistance alone, APHIS ADC involvement in the project ends when the recommendations or advice is provided to those making the request. Some direct control projects, such as the removal of a single family of beaver and the associated dams responsible for flooding a road or dispersing blackbirds from an urban roost, have well-defined end points. Other projects, such as chronic predation on livestock or at aquaculture facilities, may require continuing attention at various times of the year. These types of projects have no well-defined end points.

APPENDIX C

BIOLOGICAL ASSESSMENT

AVIAN PREDATION DETERRENT PROGRAM AT CORPS OF ENGINEERS DAMS ON THE COLUMBIA AND SNAKE RIVERS

BIOLOGICAL ASSESSMENT

February 2003

LOCATION

Activities under the Avian Predation Deterrent Program take place at all of the Corps owned and maintained dams on the Columbia and Snake Rivers. These dams include Bonneville, The Dalles, John Day, and McNary on the Columbia River and Ice Harbor, Lower Monumental, Little Goose, and Lower Granite on the Snake River. The following table lists the counties where these dams are located. Maps and diagrams related to the project are also included.

The geographic boundary for the program includes the forebays, tailraces, and fish ladder(s) at each dam. It also includes the area where juvenile salmonids are released from the transport trucks between Columbia River miles 140 to 144. This release site may be moved to Bonneville Dam in the future.

Dam Name	County (State)	County (State)	River Mile
Bonneville	Skamania (WA)	Multnomah (OR)	CRM* 146
The Dalles	Klickitat (WA)	Wasco (OR)	CRM 192
John Day	Klickitat (WA)	Sherman (OR)	CRM 214
McNary	Benton (WA)	Umatilla (OR)	CRM 292
Ice Harbor	Franklin (WA)	Walla Walla (WA)	SRM** 10
Lower Monumental	Franklin (WA)	Walla Walla (WA)	SRM 41.5
Little Goose	Whitman (WA)	Columbia (WA)	SRM 70
Lower Granite	Whitman (WA)	Garfield (WA)	SRM 107.5

*CRM – Columbia River Mile
**SRM – Snake River Mile

INTRODUCTION

In the Columbia and Snake River basins, piscivorous birds congregate in the tailrace area below hydroelectric dams in spring and summer to feed on fish, including out-migrating juvenile salmonids. Juvenile salmonids are especially vulnerable to predation by birds and other predators in the tailrace due to passage through turbines, spillways, or bypass facilities that may stun or disorient them and carry them to the surface.

This Biological Assessment examines impacts on Endangered Species Act listed species from the Avian Predation Deterrent Program at Corps of Engineers dams. The U.S. Department of Agriculture Animal and Plant Health Inspection Service, Wildlife Services (APHIS-WS), implements the program under contract to the Corps. The program has been in place for several years. The Corps is proposing to continue with this program into the future.

A program such as this is identified by the *Biological Opinion for the Reinitiation of Consultation on Operation of the Federal Columbia River Power System, Including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin,* released by NMFS on December 21, 2000. The Biological Opinion presented "reasonable and prudent alternatives" (RPA) for operation of the FCRPS that identify actions that, "combined with other ongoing and anticipated measures in the Columbia River basin, are likely to ensure a high likelihood of survival with a moderate-to-high likelihood of recovery for each of the listed species". The specific RPA dealing with this program is action 101. Through consultation with NMFS, the RPA requires the Corps to implement and maintain an effective means of discouraging avian predation at the Federal Columbia River Power System (FCRPS) dams where avian predator activity is observed. The RPA reads as follows:

> <u>Action 101</u>: *The Corps, in coordination with the NMFS Regional Forum process, shall implement and maintain effective means of discouraging avian predation (e.g. water spray, avian predator lines) at all forebay, tailrace, and bypass outfall locations where avian predator activity has been observed at FCRPS dams. These controls shall remain in effect from April through August, unless otherwise coordinated through the Regional Forum process.... The Corps shall work with NMFS, FPOM [Fish Passage Operations and Maintenance Coordination Team], USDA [U.S. Dept. of Agriculture] Wildlife Services, and USFWS [U.S. Fish and Wildlife Service] on recommendations for any additional measures and implementation schedules and report progress in the annual facility operating reports to NMFS. Following consultation with NMFS, corrective measures shall be implemented as soon as possible.*

APHIS-WS expertise and assistance has been and will be used to develop alternative strategies for the reduction in piscivorous bird predation at Corps operated hydroelectric dams. Initial efforts to reduce predation by piscivorous birds have focused on restricting overhead access to areas where smolts are most susceptible to predation. In addition, an intensive hazing program reinforced with limited lethal control, where necessary, has been used to reinforce the effectiveness of non-lethal measures and remove persistent individual piscivorous birds.

<u>PROJECT DESCRIPTION</u>

The program focuses on the birds that are listed in the following table.

List of Predacious Birds Observed at Project Sites

California gulls (*Larus californicus*)	Western grebes (*Aechmophorus occidentalis*)
Ring-billed gulls (*L. delawarensis*)	Great-blue herons (*Ardea herodias*)
Herring gulls (*L. argentatus*)	Common mergansers (*Mergus merganser*)
Caspian terns (*Sterna caspia*)	Red-breasted mergansers (*M. serrator*)
Double-crested cormorants (*Phalacrocorax auritus*)	American white pelicans (*Pelecanus erythrorhynchos*)
Belted kingfishers (*Ceryle alcyon*)	

The Proposed Alternative consists of using:

- APHIS technical assistance;
- Non-lethal control methods;
- Limited lethal control methods, where persistent individual birds and flocks have become conditioned to non-lethal methods; and
- New and improved NWRC wildlife damage management tools developed through research.

Tools that are currently implemented under the program are:
- Visual Repellants
- Auditory Repellants
- Exclusion
- Shooting
- Trapping followed by euthanasia

Tools that are available, but not currently implemented are:
- Tactile Repellants
- Chemosensory and Physiologic Repellants
- Habitat Modification
- Translocation
- Contraceptives
- Nest Removal
- Egg Addling
- Avicides

The proposed action is to continue the current Corps program that attempts to reduce piscivorous bird predation on threatened and endangered juvenile salmonids below hydroelectric dams on the lower Columbia and Snake Rivers, in accordance with the NMFS 2000 BiOp and the ESA. To meet these goals, the Corps would continue to implement an Integrated Wildlife Damage Management approach, which would allow the use of any legal technique or tool, used singly or in combination, to meet the needs of the Corps for reducing piscivorous bird predation of juvenile salmonids listed as threatened or endangered under the Endangered Species Act.

Many tools are currently recommended and implemented at Corps hydroelectric dams on the lower Columbia and Snake Rivers. Non-lethal tools currently implemented under the proposed program include exclusionary devices, auditory and visual repellents, and habitat modification. Other non-lethal tools available to APHIS-WS include, translocation, nest removal, and tactile, chemosensory, and physiological repellents. Lethal tools currently implemented under the proposed program include shooting and euthanasia following live capture. Other lethal tools available include egg addling/destruction and toxicants/avicides. All management actions would comply with appropriate Federal, State, and local laws.

Corps and APHIS-WS personnel evaluate the appropriateness of each strategy. Tools are evaluated in the context of their availability and suitability based on biological, economic, and social considerations. Following this evaluation, the tools deemed to be practical are formed into a damage management strategy for the situation. At hydroelectric facilities on the lower Columbia and Snake Rivers, Corps and APHIS-WS personnel monitor and evaluate the situation to devise the most practical and effective solution. If one tool or combination of tools fails to reduce damage, a different strategy or a modified strategy may be implemented.

Tools currently in use:

Repellents:

To be effective, repellents and other aversive strategies typically depend on irritation (pain), conditioning, or fear. The use of a combination of repellents simultaneously is recommended, but does not always ensure successful deterrence (Bradley 1980). For birds, repellents can be visual, auditory, tactile, chemosensory, or physiologic. Of these five, visual and auditory repellents are most practical and have been implemented at the dams.

Visual Repellents

Examples of visual scare devices include balloons (Shirota et al. 1983; Mott 1985), kites (Fazlul Haque et al. 1985), effigies (Andelt et al. 1997), plastic flagging, and mylar streamers (Bruggers et al. 1986; Dolbeer et al. 1986; Mason et al. 1993; Mason and Clark 1994). Functionally, visual repellents cause startle responses, as do aposematic colors (e.g., orange, red, silver) (Lipcius et al. 1980; Reidinger and Mason 1983) and cues associated with predators (e.g., hawk silhouettes, eyespots, raptor models) (Inglis 1980; Conover 1982; Inglis et al. 1983). WS has used a variety of visual devices, such as those mentioned above, with varying success. The startle responses eventually diminish (often within days or a few weeks) as a function of several variables, including weather conditions, bird numbers, and the availability of nearby unprotected foods (Draulans and van Vessem 1985; Feare et al. 1986; Draulans 1987; Mason and Clark 1995).

Effigies are more practical at hatcheries than dams, where they have been employed with limited success (Cummings et al. 1986; Andelt et al. 1997). The use of gull wings to simulate dead floating gulls has been used to protect city reservoirs from loafing gulls and resultant nutrient loading (SWD 1996). In general, effigies are most effective when they are used to protect a small area, moved frequently, alternated with other tools, and are well maintained.

A variety of light-emitting devices can be used to confuse, frighten, temporarily blind, and interfere with the activities of nocturnal predators such as the heron. Light-emitting devices left on continuously would not be practical and the majority of birds would quickly become accustomed to them. Lights are not effective for reducing avian predation at dams and may instead attract predators. In one example, night releases of fingerling smolt (most smolt passed through the bypass system at night) into the tailrace area showed an approximate 50% increase in mortality over other releases (Sims and Johnsen 1977). Since the tailrace deck near the outfalls were well lighted, it was believed to have aided predators capture their prey. Jones et al. (1997) also observed gulls feeding at night in the forebay of dams which were illuminated by flood lights.

Mylar tape has been used with mixed results to reduce damage to crops (Bruggers et al. 1986; Dolbeer et al. 1986; Tobin et al. 1988). Mylar tape and other objects with shiny surfaces, by themselves, are ineffective for deterring piscivorous birds from dams. These objects are tied down, becoming a permanent feature for birds that habituate quickly. Success with this tool is often minimal or short-term, and completely ineffective at night. Mylar tape is used to enhance the visibility of the overhead wire exclusion system to birds, thereby reducing their risk of entanglement.

Avian hydrocannons have been installed at the juvenile bypass outfall at many Corps hydroelectric dams. Hydrocannons typically consists of two 150-gpm irrigation-type impulse sprinklers powered by a submersible 25-hp three-stage electric turbine pump. The sprinklers are set to sweep a 50-yard radius with a 90-degree arc, centering on the juvenile bypass discharge plume. Under ideal conditions, the avian hydrocannon covers a small percentage of most juvenile bypass outfalls, and gulls have occasionally been observed within the spray (Jones et al. 1998). Handheld hoses spraying water are used at the transport truck release site to reduce losses of juvenile salmonids to predatory birds as the fish are being returned to the river.

Auditory Repellents

Birds will become accustomed to noises that are frequent, occur at regular intervals and intensities, and are broadcast in one location for long periods of time (Andelt and Hopper 1995; Curtis et al. 1996). Distress calls, automatic exploders, and pyrotechnic devices have been used with varying success to deter piscivorous birds from dams. The disadvantage of auditory repellents is the limited area of their effectiveness, particularly at dams, due to the width of the river and high levels of background noise. As with other techniques, noise-making devices generally are more effective when used in combination with other tools.

Distress and alarm calls have been relatively ineffective when applied as a hazing device. At dams, the apparent ineffectiveness of these calls may be due to the overwhelming level of noise generated by water rushing over spill gates and elsewhere. Propane cannons have been commonly used for the control of bird depredation and nuisance problems (Martin and Martin 1984; Moerbeek et al. 1987; Linz et al. 1993). Some models of propane cannons vary the timing and number of blasts that are emitted and physically rotate to alter the direction of the blasts. This device is effective only when augmented with other tools to reinforce the scaring property associated with each blast of the exploder (Slater 1980). Jones et al. (1996) found propane cannons to be only momentarily effective below hydroelectric dams, if at all, and on many occasions birds showed no response.

Pyrotechnics are the primary hazing tool used to deter piscivorous birds at dams. Unlike distress calls or propane cannons, birds are less likely to habituate to pyrotechnics, which are used less frequently and only when birds are in the immediate vicinity. Various types of pyrotechnics used include: cracker shells, whistle bombs, screamers, screamer rockets, bangers, and fuse rope firecrackers. Although pyrotechnics are the most practical and efficient non-lethal noise-making device available, they are only marginally effective in deterring piscivorous birds from feeding at dams where long distances are common. Birds easily fly out-of-range and continue feeding. Jones et al. (1997) noted the limited range of pyrotechnics to disperse feeding gulls at The Dalles Dam.

Exclusion:
On the lower Columbia and Snake Rivers, vast overhead wiring exclusion systems over the tailrace at each dam have been constructed and are actively maintained (see attached drawings). These wiring systems consist of 3/64" stainless steel cable stretched from the one bank of the river to the other or from the shore to the dam, depending on the availability of suitable anchor points. The average exclusion system at hydroelectric dams is comprised of 21 to 30 wires spaced at 25 to 50 foot intervals, with wires stretching anywhere from 500 to 1,800 feet. In general, wire grids have been one of the most effective deterrents available, particularly for gulls, when used in combination with hazing and limited lethal control.

Another form of exclusion is the use of Nixalite, which is the brand name for a device used to prevent birds landing on resting and loafing locations. Also known as porcupine wire, it is used in locations such as light standards, marker buoys, floating barrier logs, or other prime predator bird resting locations. The objective is to cause them to rest further from the dams and increase their travel time to and from feeding sites near the dams. By excluding prime landing sites, avian predation near the dams becomes less efficient and requires more energy expenditure than if the birds fed at alternate sites further from the dam. Porcupine wire has been used in a limited capacity at some of the dams and its use as a non-lethal deterrent is expected to continue and increase.

Shooting:
Shooting is more effective as a dispersal technique than as a way to reduce bird densities when large numbers of birds are present, and therefore is used primarily as a non-lethal tool. Shooting is an individual-specific tool and is normally used to remove a single bird and frighten away the other birds in the area. This procedure reinforces the effectiveness of pyrotechnics, propane exploders, and other exclusionary devices. At hydroelectric dams on the lower Columbia and Snake Rivers, lethal control alone is not effective in reducing avian predation because target birds must be in close proximity to the shore. As with pyrotechnics, birds that are within range and are shot at often move further offshore and continue feeding.

Shooting is selective for target species but can be relatively labor intensive (USDA 1997, revised). Shooting with shotguns, air rifles, or rim and center-fire rifles is sometimes used to manage bird damage problems when lethal tools are determined to be appropriate. The birds are killed as quickly and humanely as possible. Firearms are used in accordance with applicable laws, regulations, and safety precautions.

The Corps and APHIS-WS are sensitive to issues of safety and public concern regarding the use of firearms. To ensure safe use and awareness, APHIS-WS employees handle all firearm use and any other lethal control measures. They must complete an approved firearms safety and use training course annually.

Tools available, but not currently in use:

Tactile Repellents

Tactile chemicals are derived from petroleum or coal and are usually used to discourage birds from alighting or roosting on structures and trees. One such chemical, polybutene, can deter gulls and other birds from landing on beams, posts, and other structural materials by modifying the perching surface so that it becomes slippery or sticky, confusing a bird's tactile senses or physically preventing perching (Schafer 1991). While effective, polybutene-based repellents are thermally unstable, and melting repellent can deface structures to which it is applied (Mason and Clark 1995). Although polybutene is not considered to be directly toxic, secondary effects are death by exposure or starvation when excessive feather contamination interferes with thermoregulatory ability or flight (Schafer 1991).

Chemosensory and Physiologic Repellents

These substances are effective either because they are painful or cause sickness (Mason and Clark 1995). Research is being conducted on methyl anthranilate (MA), a product that has shown some efficacy in repelling gulls from shallow pools of water used for loafing and watering (Solman 1994). MA is not fundamentally toxic to mammals or birds, but may be moderately toxic to fish. The potential use of chemical repellents in deterring feeding birds from dams is limited under current technology and none are registered with the EPA or Food and Drug Administration (FDA) for this use. If these types of repellents are to be used in the future, additional analysis and coordination, such as for the Clean Water Act and the Endangered Species Act, will occur.

Habitat modification:

The Basinwide Salmon Recovery Strategy (Federal Caucus 2000) calls for modifying abundance and distribution of predators by altering their habitat. Habitat modification is an integral part of wildlife damage management. The type, quality, and quantity of habitat are directly related to the wildlife that is produced.

Habitat modification of nesting colonies where birds have been shown to use hydroelectric dams as a feeding area may be recommended by APHIS-WS, but the implementation of this tool would be the responsibility of State or Federal wildlife management agencies. Habitat modification is the best long-term, most ecologically sound and socially acceptable solution for reducing nesting gull populations (Blokpoel and Tessier 1986) and has been an effective tool for reducing nesting Caspian terns in the Columbia River estuary (Collis et al. 2001).

Translocation:

The trapping and translocation of piscivorous birds is generally not a practical option. Birds typically have a better homing instinct than mammals and because of this, translocation is not commonly used to solve bird problems (Conover 2001). However, the natural translocation of piscivorous bird colonies through habitat modification may be an acceptable non-lethal alternative.

Contraceptives:
Contraceptives have not proven to be an effective tool for reducing damage, and there are no contraceptive drugs registered with the FDA for piscivorous bird use.

Egg addling:
Egg addling/destruction is the practice of destroying the embryo prior to hatching. Egg addling is conducted by vigorously shaking an egg numerous times, which causes detachment of the embryo from the egg sac. Egg destruction can be accomplished in several different ways, but the most commonly used tools are manually gathering eggs and breaking them, or by oiling or spraying the eggs with food grade oil which prevents gas passage through the shell and prevents the embryo from obtaining oxygen. Although egg addling or destruction has not commonly been used for the protection of juvenile salmonids, it could be a useful damage management tool.

Avicides:
Avicides are regulated by the EPA. DRC-1339 is currently registered with the EPA for use by WS to reduce damage inflicted by California, ring-billed, and herring gull species. During the breeding season, these species may be controlled in their colonies for the purpose of protecting other colonially nesting species and to reduce populations of target gulls which damage property or crops in other areas. At any time of the year, these species may be controlled at their feeding sites at airports, industrial areas, landfills, or other non-crop areas throughout the year, if these gulls pose immediate threats to Threatened or Endangered species, or immediate public health and safety hazards. No other avicides are registered for piscivorous bird species.

LISTED SPECIES AND EFFECTS
[U.S. Fish and Wildlife Service (USFWS) Reference Number 1-7-03-SP-094 and 1-3-03-SP-0568]

Endangered
Upper Columbia Spring Chinook (*Oncorhynchus tshawytscha*)
Upper Columbia Steelhead (*O. mykiss*)
Snake River Sockeye (*O. nerka*)

Threatened
Lower Columbia Chum (*O. keta*)
Lower Columbia Chinook (*O. tshawytscha*)
Snake River Spring/Summer Chinook (*O. tshawytscha*)
Snake River Fall Chinook (*O. tshawytscha*)
Lower Columbia Steelhead (*O. mykiss*)
Middle Columbia Steelhead (*O. mykiss*)
Snake River Steelhead (*O. mykiss*)
Columbia River Basin Bull Trout (*Salvelinus confluentus*)
Bald Eagle (*Haliaeetus leucocephalus*)
Golden paintbrush (*Castilleja levisecta*)
Howellia (*Howellia aquatilis*)
Spalding's silene (*Silene spaldingii*)
Ute Ladies'-tresses (*Spiranteses diluvialis*)
Northern Spotted Owl (*Strix occidentalis caurina*)

Proposed None

All listed fish species

All of the ESA listed fish species are subject to varying levels of predation near the Corps dams. This analysis groups all of the listed fish species together because the type of impact is similar, although the numbers of fish impacted are very different between species.

Juvenile salmonids commonly experience a number of stressful events or conditions during their seaward migration. Most of these events occur serially and can have cumulative effects, as when juvenile salmon pass through dams and enter predator-inhabited tailrace areas (Mesa 1994). Because dam passage is a stressful event (Specker and Schreck 1980; Matthews et al. 1986; Maule et al. 1988; Abernethy et al. 2001), there is concern that juvenile salmonids passing through dams would not be able to cope with subsequent stressors, such as predators (Mesa 1994). If deficits in predator avoidance ability of stressed smolt are short lived, the potential for mitigative or protective measures to alleviate situations of intense predation may help decrease mortality (Mesa 1994).

The exact number of juvenile salmonids consumed below dams is difficult to determine, but minimum estimations of piscivorous predation rates have been estimated based on PIT-tag data. Collis et al. (2001) reported that passive integrated transponder (PIT) tag recoveries from colonies in the Columbia River estuary suggest that piscivorous birds do not consume the various salmonid species, rearing types, and stocks in proportions to their availability, but instead, more than 15% of PIT-tagged steelhead smolt that reached the estuary in 1998 were consumed by piscivorous birds, versus only 2% of the yearling chinook. These same phenomena have been observed in the mid-Columbia River basin. Steelhead smolt were the most vulnerable of all the species tagged for Rocky Reach Dam evaluations in 2001, and there was strong evidence that the selection pressure for steelhead smolts as prey items was quite high (Murphy 2002, draft doc.).

The repellent methyl anthranilate is not currently used in the Avian Predation Deterrent program. This compound could be toxic to fish, so if it were to be used in this program, additional consultation and coordination would take place.

The current (and proposed) Avian Predation Deterrent program reduces the amount of salmonid mortalities that occur near the dams. Therefore the program may benefit the listed salmonids. (Bull trout are present in such low numbers in the mainstem Columbia and Snake Rivers that the impacts of the program are not quantifiable.) We have determined that the Avian Predation Deterrent program, as proposed, may affect, but is not likely to adversely affect any of the ESA listed salmonid species.

Bald Eagle

Bald eagles were listed as threatened under the Endangered Species Act on February 14, 1978. Bald eagles are sometimes seen from the Corps dams included in this analysis. However, they are seldom seen within the footprint affected by the Avian Predation Deterrent program. A low probability exists that an eagle could be impacted if one were to strike an exclusion wire. An eagle could also be frightened by loud noises caused by hazing of target birds. The likelihood of having an impact is low. Several management actions (already in place) help to reduce the potential of impacting bald eagles. These actions follow:

- Mylar tape and ribbons are attached to many of the exclusion wires.
- Only trained APHIS-WS personnel are permitted to shoot or euthanize persistent target birds.
- Birds that are shot or euthanized are disposed of so that they do not become an attractant to eagles or other raptors.

We have determined that the Avian Predation Deterrent program may affect, but is not likely to adversely affect bald eagles.

Northern Spotted Owl

Northern spotted owls were listed as threatened in June 1990. They primarily occur in forest habitats. They are not found near any of the Corps dams. We have determined that the Avian Predation Deterrent program at Corps of Engineers dams will have no effect on northern spotted owls.

Listed Plants

ESA listed plant species (Golden paintbrush, Howellia, Spalding's silene , and Ute Ladies'-tresses) will not be affected by the Avian Predation Deterrent program. Brief descriptions of the plants follow:

Golden paintbrush was listed as threatened in June 1997. Golden paintbrush plants occur in open grasslands at elevations below 330 feet around the periphery of the Puget Trough. They generally grow in clumps, with individual plants consisting of one to 15 stems. They flower from April to June with brilliant golden to yellow flowers. The plant reaches about 12 inches in height.

Howellia, or water Howellia, was listed as threatened in July 1994. This plant is an aquatic annual plant that grows up to 24 inches in height. It has extensively branched, submerged or floating stems with narrow leaves. It has two types of flowers: small, inconspicuous flowers beneath the water surface, and white flowers above the water surface.

Spalding's silene was listed as threatened in October 2001. It is a member of the carnation family. It is a long-lived perennial herb with four to seven pairs of lance shaped leaves and a spirally arranged group of small greenish-white flowers. The distribution and habitat of the plant is limited. Populations have been found in Asotin, Lincoln, Spokane, and Whitman counties in Washington.

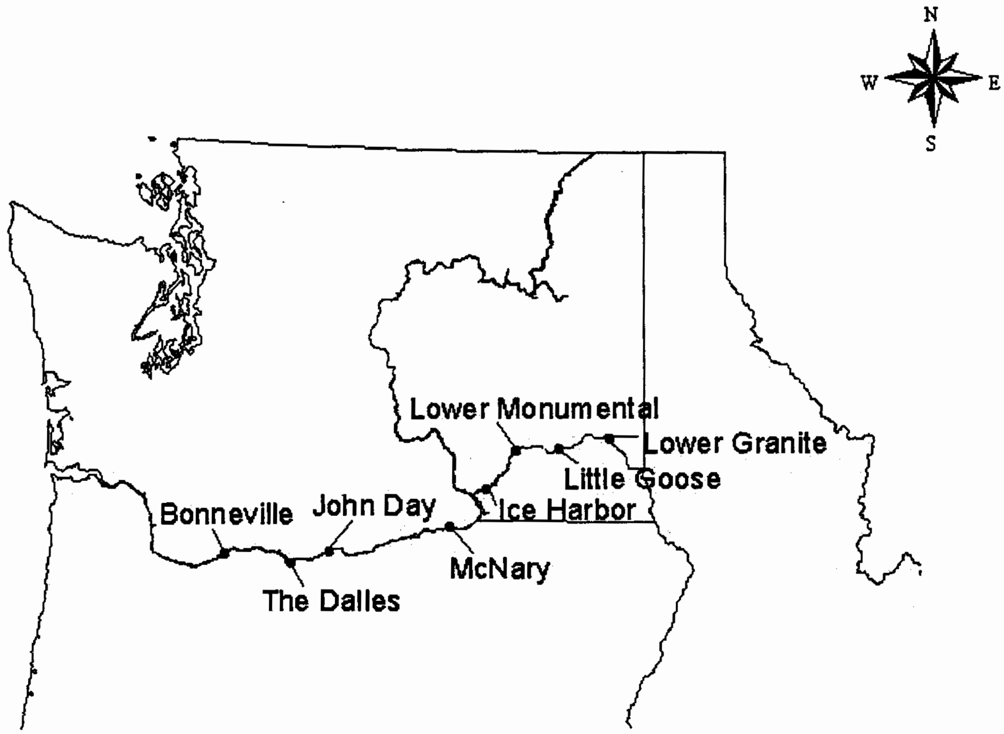
Ute ladies'-tresses was listed as threatened in January 1992. It is an orchid known to inhabit wetland and riparian areas. In Washington it has been found at about 1,500 feet elevation at a site in Okanogan County of the northeastern part of the state and more recently at a lower elevation near Rocky Reach on the Columbia River. In other parts of its range it is found up to about 7,000 feet generally in moist areas in open shrub or grassland. Positive identification of the plant can only be made while it is flowering. The plant generally flowers during August and September with three to 15 small white or ivory colored flowers clustered in a spike arrangement at the top of the stem. The can grow up to 20 inches high.

None of these plants are known to be present near the Corps dams. Activities associated with the Avian Predation Deterrent program are not expected to have any impact on any of these plant species. We have determined that the program will have no effect on Golden paintbrush, Howellia, Spalding's silene, or Ute ladies'-tresses.

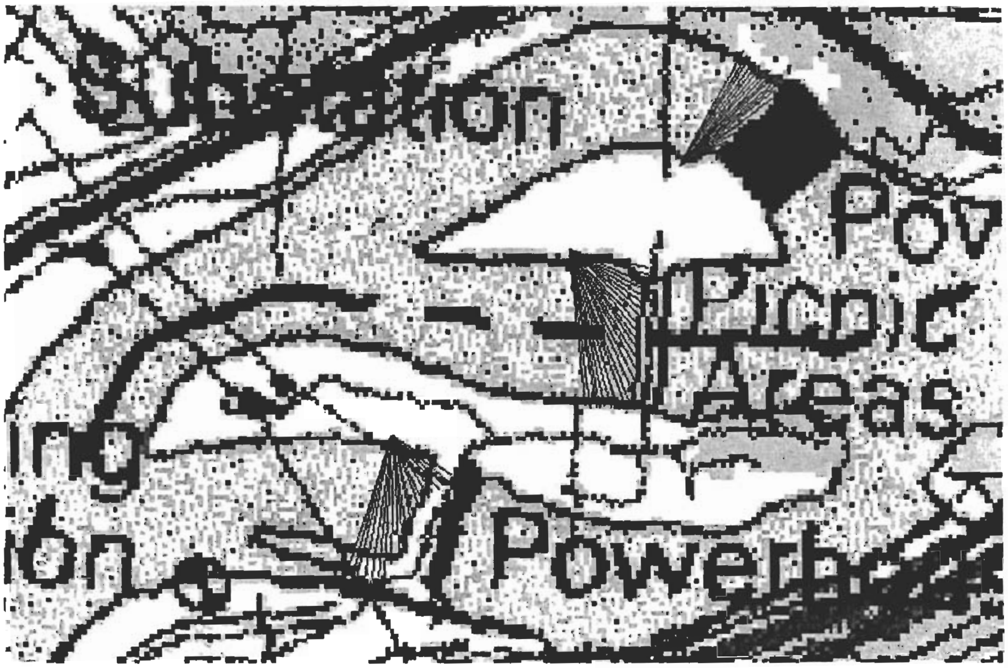
Determinations Summary

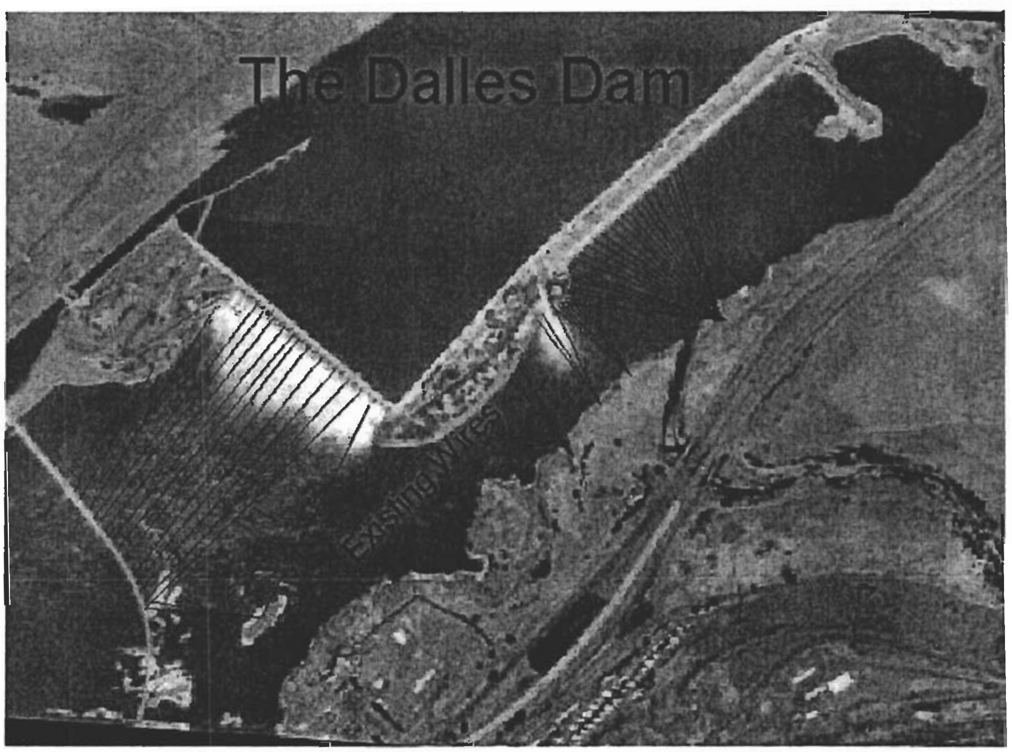
Species	**Status**	**Determination**
Upper Columbia Spr. Chinook	Endangered	May Affect, Not Likely to Adversely Affect (beneficial effect)
Upper Columbia Steelhead	Endangered	May Affect, Not Likely to Adversely Affect (beneficial effect)
Snake River Sockeye	Endangered	May Affect, Not Likely to Adversely Affect (beneficial effect)
Lower Columbia Chum	Threatened	May Affect, Not Likely to Adversely Affect (beneficial effect)
Lower Columbia Chinook	Threatened	May Affect, Not Likely to Adversely Affect (beneficial effect)
Snake River S/S Chinook	Threatened	May Affect, Not Likely to Adversely Affect (beneficial effect)
Snake River Fall Chinook	Threatened	May Affect, Not Likely to Adversely Affect (beneficial effect)
Lower Columbia Steelhead	Threatened	May Affect, Not Likely to Adversely Affect (beneficial effect)
Middle Columbia Steelhead	Threatened	May Affect, Not Likely to Adversely Affect (beneficial effect)
Snake River Steelhead	Threatened	May Affect, Not Likely to Adversely Affect (beneficial effect)
Columbia Basin Bull Trout	Threatened	May Affect, Not Likely to Adversely Affect
Bald Eagle	Threatened	May Affect, Not Likely to Adversely Affect
Northern Spotted Owl	Threatened	No Effect
Golden paintbrush	Threatened	No Effect
Howellia	Threatened	No Effect
Spalding's Silene	Threatened	No Effect
Ute Ladies'-tresses	Threatened	No Effect

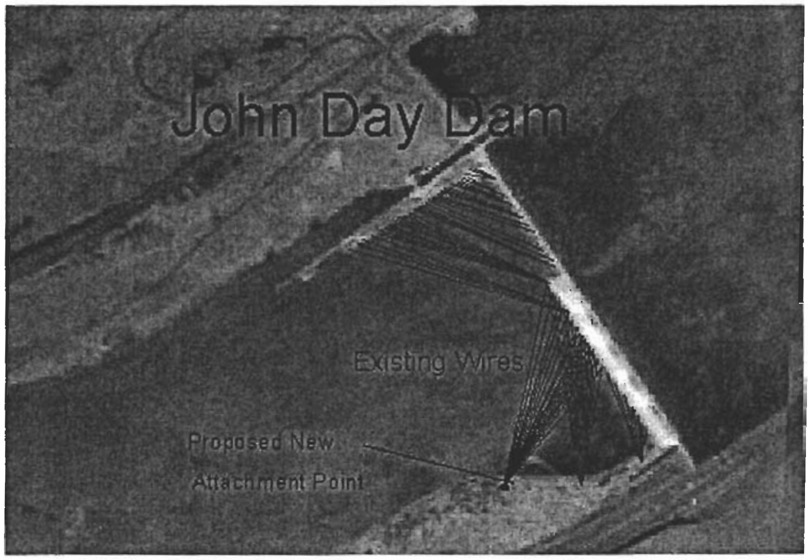
Corps of Engineers Dams

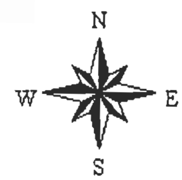


Bonneville Dam



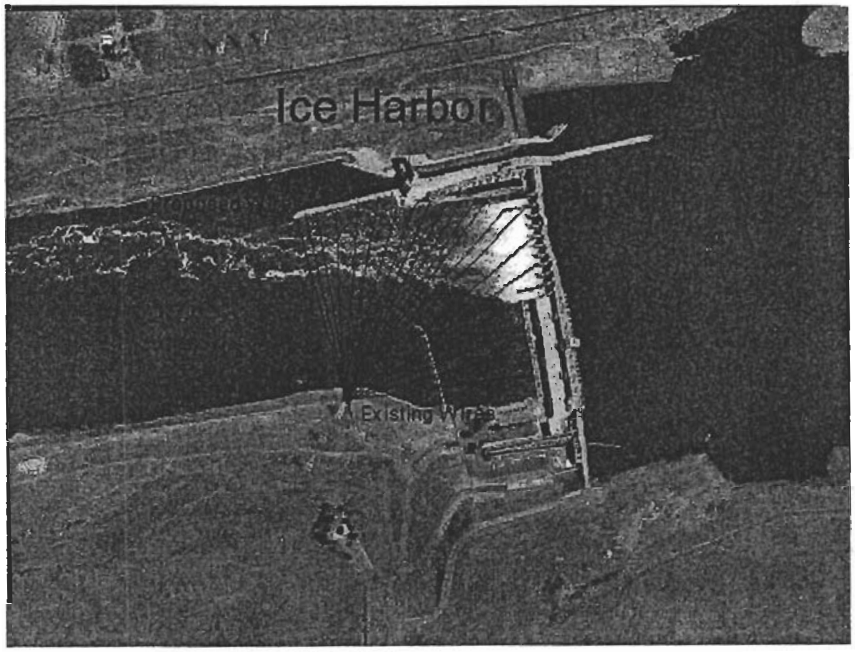


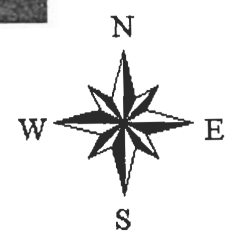




Existing Wires

Proposed Wires


Ice Harbor
Existing Wires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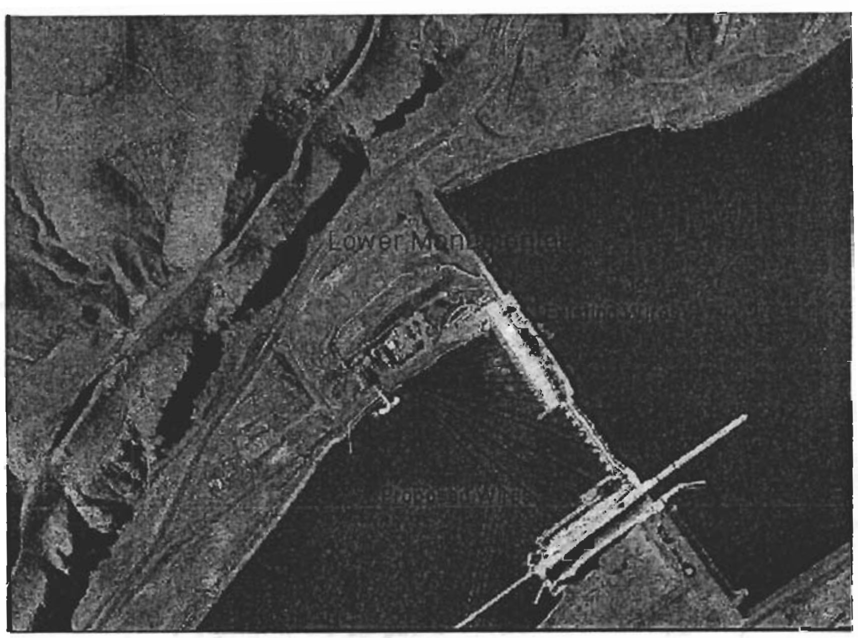


Little Goose


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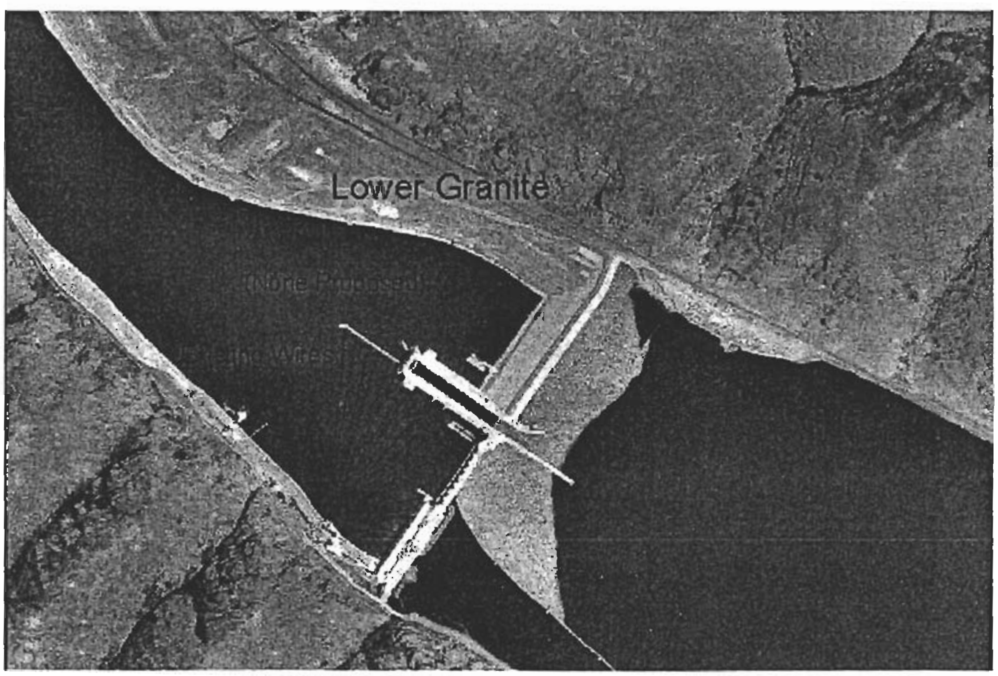
Lower Granite

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APPENDIX D

FISH PASSAGE PLAN

(CY04 Excerpts)

http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/

	Winter Maintenance Period	Juvenile Fish Passage Season	Reporting
Bonneville	**First Powerhouse** **2.4.1.1.g. Avian Abatement Measures.** Reinstall or repair avian predator control lines in present locations as soon as possible following damage or removal. Install and maintain new avian predator control lines in locations determined to be significantly impacted by avian predators. Avian abatement measures shall be in place by April 1 unless this work is delayed because of inclement weather. If this occurs, the work will be completed as soon as the weather permits after that date. However, there will be no avian abatement measures, other than avian lines, performed from September through March each year. **Second Powerhouse** **2.4.2.1.i. Avian Predation Lines.** Reinstall or repair avian predator control lines in present locations as soon as possible following significant damage or removal. Install and maintain new avian predator control lines in locations determined to be significantly impacted by avian predators. Avian abatement measures shall be in place by April 1 unless this work is delayed because of inclement weather. If this occurs, the work will be completed as soon as the weather permits after that date. However, there will be no avian abatement measures, other than avian lines, performed from September through March each year.	**First Powerhouse** **2.4.1.2.k.** Reinstall or repair avian predator control lines in present locations as soon as possible following damage or removal. Where possible, install and maintain new avian predator control lines in locations determined to be significantly impacted by avian predators. Implement other avian abatement measures as necessary from April through August only. **Second Powerhouse** **2.4.2.2.J.** Reinstall or repair avian predator control lines in present locations as soon as possible following damage or removal. Where possible, install and maintain new avian predator control lines in locations determined to be significantly impacted by avian predators. Implement other avian abatement measures as necessary from April through August only. **Fish Transport Pipe and Flume** **2.4.2.4.b.5.** Reinstall or repair avian predator control lines in present locations as soon as possible following damage or removal. Where possible, install and maintain new avian predator control lines in locations determined to be significantly impacted by avian predators. Implement other avian abatement measures as necessary from April through August only. **Juvenile Monitoring Facility** **2.4.2.5.b.5.** Monitor outfall avian cannons.	**2.6.3** The annual report shall also include a description of all actions taken to discourage avian predation at the project, with an overview of the effectiveness of the activities in discouraging avian predation.

	Winter Maintenance Period	Juvenile Fish Passage Season	Reporting
The Dalles	**2.4.1.1.e.** Reinstall or repair avian predator control lines in the present locations as soon as possible following damage or removal. Install and maintain new avian predator control lines where possible, in locations determined to be significantly impacted by avian predators. Avian abatement measures shall be in place by April 1 unless this work is delayed because of inclement weather. If this occurs, the work will be completed as soon as the weather permits after that date. However, there will be no avian abatement measures, other than avian lines, performed from September through March each year.	**2.4.1.2.h.** Reinstall or repair avian predator control lines in present locations as soon as possible following damage or removal. Where possible, install and maintain new avian predator control lines in locations determined to be significantly impacted by avian predators. Implement other avian abatement measures as necessary from April through August only.	**2.6** The annual report shall also include a description of all actions taken to discourage avian predation at the project, with an overview of the effectiveness of the activities in discouraging avian predation.
John Day	**2.4.1.1.j. Avian Abatement Measures.** Reinstall or repair avian predator control lines in present locations as soon as possible following damage or removal. Install and maintain new avian predator control lines in locations determined to be significantly impacted by avian predators. Avian abatement measures shall be in place by April 1, unless this work is delayed because of inclement weather. If this occurs, the work will be completed as soon as the weather permits after that date. However, there will be no avian abatement measures, other than avian lines, performed from September through March each year.	**2.4.1.2.l** Reinstall or repair avian predator control lines in present locations as soon as possible following damage or removal. Install and maintain new avian predator control lines in locations determined to be significantly impacted by avian predators. Implement other avian abatement measures as necessary in areas where avian lines are not practical. Implement other avian abatement measures as necessary from April through August only.	**2.6** The annual report shall also include a description of all actions taken to discourage avian predation at the project, with an overview of the effectiveness of the activities in discouraging avian predation.
McNary	**2.3.1.1.f. Avian Predation Areas (Forebay and Tailrace).** Inspect bird wires and other deterrent devices and repair or replace as needed. Where possible, install additional bird wires or other deterrent devices to cover areas of known avian predation activity.	**2.3.2.1.f. Avian Predation Areas (Forebay and Tailrace).** **1**. Bird wires and other avian deterrent devices should be monitored to assure they are in good condition. Any broken wires or devices should be replaced as soon as possible. **2**. Harassment program in place to deter avian predation in areas actively used by birds and not covered by bird wires or other devices. **3**. Project biologists shall routinely monitor project areas to determine areas of active avian predation and, if possible, adjust harassment program to cover these areas or install bird wires or other deterrent devices to discourage avian predation activities.	**2.3.3** The annual report shall also include a description of all actions taken to discourage avian predation at the project, with an overview of the effectiveness of the activities in discouraging avian predation.

	Winter Maintenance Period	Juvenile Fish Passage Season	Reporting
Ice Harbor	**f. Avian Predation Areas (Forebay and Tailrace).** Inspect bird wires and other deterrent devices and repair or replace as needed. Where possible, install additional bird wires or other deterrent devices to cover areas of known avian predation activity.	**f. Avian Predation Areas (Forebay and Tailrace).** **1**. Bird wires and other avian deterrent devices should be monitored to assure they are in good condition. Any broken wires or devices should be replaced as soon as possible. **2**. Harassment program in place to deter avian predation in areas actively used by birds and not covered by bird wires or other devices. **3**. Project biologists shall routinely monitor project areas to determine areas of active avian predation and, if possible, adjust harassment program to cover these areas or install bird wires or other deterrent devices to discourage avian predation activities.	**2.3.3** The annual report shall also include a description of all actions taken to discourage avian predation at the project, with an overview of the effectiveness of the activities in discouraging avian predation.
Lower Monumental	**f. Avian Predation Areas (Forebay and Tailrace).** Inspect bird wires and other deterrent devices and repair as needed. Where possible, install additional bird wires or other deterrent devices to cover areas of known avian predation activity.	**f. Avian Predation Areas (Forebay and Tailrace).** **1**. Bird wires and other avian deterrent devices should be monitored to assure they are in good condition. Any broken wires or devices should be replaced as soon as possible. **2**. Harassment program in place to deter avian predation in areas actively used by birds and not covered by bird wires or other devices. **3**. Project biologists shall routinely monitor project areas to determine areas of active avian predation and, if possible, adjust harassment program to cover these areas or install bird wires or other deterrent devices to discourage avian predation activities.	**2.3.3** The annual report shall also include a description of all actions taken to discourage avian predation at the project, with an overview of the effectiveness of the activities in discouraging avian predation.

	Winter Maintenance Period	Juvenile Fish Passage Season	Reporting
Little Goose	**f. Avian Predation Areas (Forebay and Tailrace).** Inspect bird wires and other deterrent devices and repair or replace as needed. Where possible, install additional bird wires or other deterrent devices to cover areas of known avian predation activity.	**f. Avian Predation Areas (Forebay and Tailrace).** **1**. Bird wires and other avian deterrent devices should be monitored to assure they are in good condition. Any broken wires or devices should be replaced as soon as possible. **2**. Harassment program in place to deter avian predation in areas actively used by birds and not covered by bird wires or other devices. **3**. Project biologists shall routinely monitor project areas to determine areas of active avian predation and, if possible, adjust harassment program to cover these areas or install bird wires or other deterrent devices to discourage avian predation activities.	**2.3.3** The annual report shall also include a description of all actions taken to discourage avian predation at the project, with an overview of the effectiveness of the activities in discouraging avian predation.
Lower Granite	**g. Avian Predation Areas (Forebay and Tailrace).** Inspect bird wires and replace as needed. Where possible, add additional bird wires or other deterrent devices to cover areas of known avian predation activity.	**e. Avian Predation Areas (Forebay and Tailrace).** **1**. Bird wires and other avian deterrent devices should be monitored to assure they are in good condition. Any broken wires or devices should be replaced as soon as possible. **2**. Harassment program in place to deter avian predation in areas actively used by birds and not covered by bird wires or other devices. **3**. Project biologists shall routinely monitor project areas to determine areas of active avian predation and, if possible, adjust harassment program to cover these areas or install bird wires or other deterrent devices to discourage avian predation activities.	**2.3.3** The annual report shall also include a description of all actions taken to discourage avian predation at the project, with an overview of the effectiveness of the activities in discouraging avian predation.

APPENDIX E

CULTURAL RESOURCE INVENTORY REPORT

APPENDIX F

COMPOSITE ENDANGERED AND THREATENED SPECIES LIST

USFWS Reference # 1-7-03-SP-094 (Portland), 1-3-04-SP –556 (updates 1-3-03-SP-0568 - Lacey), and 1-9-04-SP-0145 (updates 1-9-03SP-0142 - Spokane)

1. Snake River sockeye salmon (*Oncorhynchus nerka*) - **endangered November 1991**
2. Upper Columbia River spring-run Chinook salmon (*O. tshawytscha*) - **endangered March 1999**
3. Lower Columbia River Chinook - **threatened March 1999**
4. Snake River fall-run Chinook - **threatened April 1992**
5. Snake River spring/summer Chinook - **threatened April 1992**
6. Upper Columbia River steelhead (*O. mykiss*) - **endangered August 1997**
7. Mid-Columbia River steelhead - **threatened March 1999**
8. Lower Columbia River steelhead - **threatened March 1998**
9. Snake River basin steelhead - **threatened August 1997**
10. Columbia River chum salmon (*O. keta*) – threatened March 1999
11. Bull trout (*Salvelinus confluentus*) – threatened June 1998
12. Bald eagle (*Haliaeetus leucocephalus*) – threatened February 1978
13. Golden paintbrush (*Castilleja levisecta*) – threatened June 1997
14. Northern spotted owl (*Strix occidentalis caurina*) – threatened July 1990
15. Ute ladies-tresses (*Spiranthes divulvialis*) – threatened January 1992
16. Spalding's silene (catchfly) (*Silene spaldingii*) – threatened October 2001
17. Canada Lynx (*Lynx canadensis*) (Bonneville) – threatened March 2000
18. Gray Wolf (*Canis lupes*) (Bonneville) – threatened March 1967
19. Grizzly Bear (*Ursus arctos = U. a. horribilus*) (Bonneville) – threatened March 1967
20. Critical habitat for northern spotted owl - **designated** (Bonneville) -
21. Critical habitat for bull trout - **proposed**
22. Yellow-billed cuckoo (*Coccyzus americanus*) - **candidate**
23. Washington ground squirrel (*Spermophilus washingtoni*) – **candidate**
24. Oregon spotted frog (*Rana pretiosa*) **- candidate**
25. Coho salmon (Lower Columbia River) (*O. kisutch*) - **candidate**
26. Northern wormwood (*Artemisia campestris* ssp. w*ormskioldii*) - **candidate**
27. Mardon Skipper (*Polites mardon*) **candidate** (Bonneville)

APPENDIX G

IMPACT TO AVIAN PREDATORS

Analysis of this issue is limited to those species lethally removed during APD management. The analysis for magnitude of impact (See also Section 4.0.1 Method of Analysis of this document) generally follows the process described in Chapter 4 of the USDA-APHIS-WS Programmatic EIS (1997, revised) which defines magnitude as "*...a measure of the number of animals killed in relation to their abundance*." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable take levels, and actual take data. Qualitative determinations are based on population trends and take data when available. Tables 1 through 9 of this Appendix show, by species and location, the numbers of birds killed and hazed at Corps hydroelectric dams as a result of APD management on the Lower Columbia and Snake Rivers between 1997 and 2001. Tables 10 through 18 of this Appendix show, by month and location, the numbers of birds killed and hazed at Corps hydroelectric dams. The predominant months for APD activity are April through July, which correspond with juvenile salmonid migration.

Precise counts of the bird populations addressed in this EA do not exist. Table A provides population data presented at the Anadromous Fish Evaluation Program Annual Review 2002 (CORPS 2002c) and CORPS 2002b.

Table A. Estimated Colony Population Data for Piscivorous Birds in 2002

Species	Location	Population
Gull colony	Little Miller Island	3,487
	Three Mile Canyon Island	792
	Richland Island	1,003
	Island 18	529
Cormorant colony	Foundation Island	3,541
Caspian tern colony	Crescent Island	1,160
	East Sand Island	19,866
	West Tern Island	174
	Solstice Island	1,153
Pelican colony	Badger Island	216

(Corps 2002 b,c; Collis et. al. 2002b)

When precise population estimates are lacking, it is common practice for management agencies to use population trend analyses to determine if species populations are 'increasing', 'stable', or 'decreasing'. These trend analyses are determined by taking actual counts at specific locations at regular intervals and comparing several years of data. When the Breeding Bird Survey (BBS) and Christmas Bird Count (CBC) routes do not include habitat commonly used by piscivorous birds, direction from wildlife management agencies and published literature, such as those mentioned above, may be used to determine population trends. Often times, published literature provides some of the best information available on population trends.

Breeding Bird Survey

The BBS is a large-scale survey initiated 1966 to monitor the status and trends of breeding birds throughout North America. This survey has provided more than 30 years of data on abundance, distribution, and population trends for more than 400 bird species (Downes and Collins 2003). These data are calculated annually by the United States Geologic Survey (USGS) Patuxent Wildlife Research Center. The BBS index is taken from the BBS, a summer count survey conducted by volunteers and coordinated by the USGS to monitor long-term population trends at the state, regional, and national level. Like other surveys, the BBS is based on a number of assumptions, biases, and limitations. For example, the BBS is limited by placement of roads, traffic noise interference in some cases, and preference of some bird species for roadside habitats (Bystrak 1981). Given that 22% of the species in the survey can be characterized as birds with specialized habitats or limited distribution in the BBS range (Sauer et al. 2001). This survey has not characteristically been the best population monitoring tools for colonial nesting species such as gulls, terns, and cormorants. BBS counts of all the species discussed in this EA can be highly variable and inconsistent from one year to the next. The BBS generally uses roads for survey routes, and as such, it has not characteristically been the best population-monitoring tool for colonial nesting species such as gulls and cormorants. A measure of the statistical significance of a trend is represented by a "P" value. The USFWS has stated that those species with "P" values greater than 0.1 do not show trend estimates with an acceptable level of certainty or significance (USDA 2001). BBS data are provided at http://www.mbr-pwrc.usgs.gov/bbs.html.

Christmas Bird Count

The CBC index is derived from a winter count survey conducted by the National Audubon Society (NAS) in December and January, and is used primarily as a historical reference to indicate declines in species at the state, regional, and national level. The 100-year population trend analysis was derived from CBC survey year 1901 through 2001 in both Washington and Oregon States. , Unlike the BBS, large portions of the Columbia River and the Lower Columbia and Snake Rivers are surveyed by the CBC. Winter weather patterns often affect bird migrations, therefore these counts vary from year to year. CBC data are provided at http://www.audubon.org/bird/cbc/hr/.

Published Literature

California gulls, ring-billed gulls, and double-crested cormorants are the primary avian predators in the Columbia River basin (NMFS 2000b). A fairly large body of published literature exists which documents population trends and other biological information for these species.

Sightings of these species in the Columbia River basin were rare to non-existent 60 years ago (NMFS 2000b). Since that time, populations have dramatically increased due to the expansion of cities and landfills, the advent of large-scale agriculture, the creation of islands and reservoirs, and protection granted under the Migratory Bird Treaty Act (USDA 2001).

1. Gulls

Breeding Bird Survey

California gull:

BBS data throughout the United States are inconclusive due to high levels of variance. BBS routes within USFWS Region 1 (Pacific States) documented downward trends of -4.7% ($p<0.01$) between 1966 and 2000 and -5.1% ($p<0.01$) between 1980 and 2000 (Sauer et al. 2001).

Ring-billed gull:

Survey-wide within the United States, the BBS documented an upward trend of 4.6% ($p<0.01$) between 1966 and 2000 and 3.5% ($p<0.01$) between 1980 and 2000 (Sauer et al. 2001). BBS routes within USFWS Region 1 documented an upward trend of 2.9% ($p<0.06$) between 1980 and 2000 (Sauer et al. 2001). Summer distribution of ring-billed gulls is concentrated in eastern and south-central Oregon State (www.mbr-pwrc.usgs.gov), and BBS routes do not survey the Lower Columbia River. Regardless, in Oregon State, the BBS documented downward trends of -9.7% ($p<0.03$) between 1966 and 2000, and -9.7% ($p<0.08$) between 1980 and 2000 (Sauer et al. 2001).

Herring gull:

No statistically significant data are available for BBS routes within Washington State, Oregon State, USFWS Region 1, or survey-wide within the United States.

Christmas Bird Count

California gull:

The winter CBC survey for Washington and Oregon States show an increasing population trend between 1901 and 1970, with a total of 21 counted in both States up to the year 1916. The California gull population trend increased between 1970 and 2001, with approximately 6,400 documented in Washington and Oregon States in the 2001 winter survey.

Ring-billed gull:

The 1901-2001 winter CBC surveys for Washington and Oregon States show an increasing population trend. Washington ring-billed gull trends increased from a high of 900 in 1953, to 7,800 in 2000. In Oregon State, population trends increased from a high of 1,500 in 1963 to peaks of 13,000 in 1983 and 12,600 in 1992. The 2001 winter survey for both States documented approximately 9,600 ring-billed gulls.

Herring gull:
CBC surveys for Washington and Oregon States show a stable or slightly increasing population trend. Washington herring gull counts peaked in 1958 (814), 1982 (1,171), and 1986 (1,517). In Oregon State, counts peaked in 1956 (2,000), 1976 (2,264), and 1984 (2,025). The 2001 winter survey for both States documented approximately 1,300 herring gulls.

Published Literature
In North America, the California gull is distributed north to south from the Northwest and Nunavut Territory, Canada, to Mono Lake and south San Francisco Bay, California, and from the Dakotas in the east to the Pacific Ocean (Winkler 1996). The breeding population in Washington State was approximately 138,000 pairs in 1980 (Conover 1983), not including sub-adults, which become sexually mature at 4 years of age. Average life expectancy is unknown, but the oldest band-recovered bird was 27 years old. The annual sub-adult survival is 92% and 75%-79% for adults (Winkler 1996).

In North America, this species is widely distributed and increasing (Conover 1983; USDA 1997 revised; USDA 2001) throughout the provinces of Canada and Great-Lakes region, west to the Pacific coast, and south from Washington State to central Mexico, the Gulf of Mexico and eastward through the Mississippi Valley and along the Atlantic coast north to Massachusetts. An estimated 3 to 4 million individuals inhabited North America in 1990, and 2001 population estimates for Washington State may number approximately 390,000 breeding individuals, based on 106,000 birds and a 6.4% growth rate reported by Conover (1983) in 1980. Ring-billed gulls become sexually mature at 4 years of age and have a life expectancy of approximately 20 years (Southern 1975).

Herring gulls are distributed from the Atlantic coast, north to Baffin Island and throughout arctic Canada into eastern Alaska. From Alaska, their range expands south along the Pacific coast to the Baja Peninsula and the Gulf of Mexico. Only non-breeding birds appear to be migratory and winter throughout Washington State. Herring gulls become sexually mature at 4 years of age, have an annual adult survivorship of 80-85%, and a life expectancy of approximately 15-20 years (Kadlec and Drury 1968).

California and ring-billed gulls are both species of wildlife damage management concern in Washington State (Jones et al. 1999; NMFS 2000b; USDA 2001), and feed upon juvenile salmonids at hydroelectric dams throughout the Columbia River basin (Jones et al. 1996, 1997, 1998, 1999; USDA 2001). The Washington Ornithological Society (WOS) (1999-2001) shows California and ring-billed gulls to be commonly abundant residents of eastern and western Washington State during juvenile salmonid migrations. Herring gulls are commonly abundant in eastern Washington State in October through April (WOS 1999-2001).

According to the published literature, populations of California and ring-billed gulls are increasing throughout the State (Conover 1983; USDA 2001).

- In 1982, approximately 6,000 California and 5,600 ring-billed gulls were recorded near Richland, WA. Fifteen years later, Roby et al. (1998) estimated over 70,000 California and ring-billed gulls occupying the same area.
- In 1995, mixed colonies of California and ring-billed gulls occupied 17 islands from Chief Joseph Dam downstream to The Dalles Dam (York et al. 2000). Gull populations on 5 of those 17 islands were estimated at 35,000 breeding adults.
- In 1996, York et al. (2000) recorded a breeding population of 7,000 ring-billed gulls and 200 California gulls on Cabin Island, 1.5 km upstream of Priest Rapids Dam.

A study conducted with the NAS Research Department, discussed the impact of lethal control on large populations of gulls. No effective controls were known to lower gull populations over large expanses (Thomas 1972), and that while island gull populations may be reduced over a period as long as 10 years, the lower densities resulting from control programs may improve the health and reproductive capacity of the surviving individuals (Coulson et al. 1982). The NAS Research Department also made reference to situations where control efforts have killed hundreds of gulls, which had little long-term effect because most gull populations are large enough to replace even substantial losses in the breeding population from non-breeders (Kadlec and Drury 1968).

Summary of impacts to gulls

The Non-Lethal Tools Only alternative is not likely, nor designed, to impact gull populations on a Statewide basis. APHIS-WS EA and FONSI (2001a) on migratory birds analyzed the impacts of migratory bird damage management activities in Washington State, which included discussions on California, ring-billed, and herring gulls. In that analysis, which included the cumulative impact of gulls taken at Corps facilities, the USFWS concurred that the take level of California, ring-billed, and herring gulls for the purpose of site-specific damage control was not likely to effect populations at the regional or national scale (USDA 2001). Overall, based upon recent and historical studies conducted on California and ring-billed gulls in the Pacific Northwest, these trends show populations that currently appear to be healthy and increasing, and herring gull populations that appear to be stable. The preferred alternative would have no bearing on these populations.

2. *Double-crested cormorants*

Breeding Bird Survey

No significant population trends were verified at the State or regional level, however, throughout the United States the BBS documented an upward trend of 7.6% ($p<0.03$) between 1966 and 2000, and 9.4% ($p<0.04$) between 1980 and

2000 (Sauer et al. 2001). Site-specific, individual BBS routes which survey lakes and rivers suggest that the double-crested cormorant population is increasing, particularly so east of the Cascade Range (Sauer et al. 2001).

Christmas Bird Count

The 1901-2001 winter CBC surveys for Washington and Oregon States show an increasing population trend. Washington State double-crested cormorant trends increased from a high of 96 in 1956, to 7,300 in 2001. In Oregon State, the population trends increased from a high of 180 in 1954, to 2,900 in 2001.

Published Literature

Double-crested cormorant distribution in Washington State is described by Smith et al. (1997). The double-crested cormorant is widely distributed in North America, occurring as far south as San Salvador and the Caribbean, north along the coastal shores of Quebec, and northwest along the Alaskan Peninsula. The recent increase in the North American population has been well documented (USDA 1999; USDA 2001). Van de Veen (1973) found that over 20% of breeders of a slowly increasing (8% per year) Pacific coast population were only one to two years of age, and thereby calculated that most birds breed at the beginning of their fourth year and a life expectancy of 6.1 years.

The WOS (1999-2001) showed the double-crested cormorant to be present, but uncommon (i.e., site-selective) residents from April through September in eastern Washington State and commonly abundant, year-round residents of western Washington. In the 1800s and early 1900s, numbers of cormorants declined along the Pacific coast. In Washington and Oregon States, double-crested cormorant populations have increased over the last few decades (Roby et al. 1998; Collis et al. 1999; Sauer et al. 2001).

Summary of impacts to double-crested cormorants

The No-Action alternative is not likely, nor designed, to impact double-crested cormorant populations on a statewide basis. The reduction of double-crested cormorant usage of site-specific areas where juvenile salmonids are unnaturally exposed and susceptible to predation may require that some individuals be lethally removed. It is the goal of the Corps to reduce avian predation of ESA-listed and non-listed juvenile salmonids, as required under the ESA, rather than to control or manage fish and wildlife populations, and as such, there have been no discernable impact on double-crested cormorant population levels. APHIS-WS' EA (2001) on migratory birds analyzed the impacts of migratory bird damage management activities in Washington State, which included discussions on double-crested cormorants. In that analysis, which included the cumulative impact of double-crested cormorants taken at Corps facilities, the USFWS concurred that the double-crested cormorant take level, for the purpose of site-specific damage control, was not likely to effect populations at the regional or national scale (USDA 2001). Overall, based upon recent and historical studies conducted on double-crested cormorants in the Pacific Northwest, these trends show populations that currently appear to be healthy and increasing.

3. *Secondary Avian Predators*

In the past, limited lethal control of western grebes, great-blue herons, and mergansers (Table 1) has been authorized when individuals congregate in or below fish ladders, spillways, and outfalls, and only when non-lethal deterrents have been ineffective. No lethal control of secondary avian predators would occur under the preferred alternative – Non-Lethal Tools Only. State agencies have expressed concern for great-blue heron colonies.

American white pelicans are listed as a Washington State endangered species. The American white pelican's persistence and use patterns below the McNary Dam complex implicates them as contributors to juvenile salmonid mortality. They were first consistently observed in the tailrace in small numbers in mid-April. A maximum instantaneous count of 24 pelicans was recorded. The diel foraging pattern of the pelicans generally coincided with the diel pattern of salmonid passage through the bypass system. Bird deterrent measures employed at the dam for other piscivorous birds initially altered the foraging behavior of the American white pelicans. However, the pelicans rapidly acclimated (CORPS 2003).

Migratory birds would not be killed under the preferred alternative. American white pelicans would only be intentionally hazed if they take up residence within 50 feet of the juvenile fish outfall for longer than 10 minutes. All secondary predators, including great-blue herons and white pelicans, may be subject to non-lethal measures when congregated at the same site-specific areas where juvenile salmonids are unnaturally exposed and susceptible to predation.

Table 1 – Yearly Summary of Species Hazed and Killed at All Project Sites

Project	(All)

		Year					
Species	Data	1997	1998	1999	2000	2001	2002
american white pelican	killed	0	0				0
	hazed	2	6				489
belted kingfisher	killed				0		0
	hazed				7		4
bonaparte gull	killed						0
	hazed						478
california gull	killed	44	5	366	227	986	94
	hazed	56	0	2893	7001	11157	16119
caspian tern	killed	0		0	0	0	**1
	hazed	2		32	13	283	612
common merganser	killed	1	0		0		0
	hazed	0	80		4		2
dabbling duck	killed				0		
	hazed				50		
diving duck	killed				0		
	hazed				12		
double-crested cormorant	killed	121	202	229	182	95	6
	hazed	1627	1999	1963	4256	4074	7583
forster tern	killed	0	7	0	0	0	0
	hazed	6	3	50	226	68	63
great-blue heron	killed	0	7	0	0	0	0
	hazed	6	3	50	226	68	50
herring gull	killed	3	10	29	93	18	48
	hazed	0	0	0	1240	151	2767
mallard	killed				0		
	hazed				15		
osprey	killed			0			
	hazed			12			
red-breasted merganser	killed				0		
	hazed				101		
ring-billed gull	killed	49	389	2844	906	499	530
	hazed	2670	2106	26125	24421	11365	29448
unidentified grebe	killed						15
	hazed						823
unidentified gull	killed	675	2589		0		
	hazed	9689	14492		22		
western grebe	killed	66	73	80	4	35	
	hazed	1011	885	106	1824	510	
Total	killed	956	3265	3519	1319	1615	694
	hazed	15063	19571	31181	37952	27457	58478

** unintentional take caused by a misdirected pyrotechnic

Table 2 – Yearly Summary of Species Hazed and Killed at Bonneville

Project	**Bonneville**

		Year				
Species	Data	1998	1999	2000	2001	2002
belted kingfisher	killed			0		
	hazed			1		
california gull	killed		62	30	122	13
	hazed		54	84	560	1190
caspian tern	killed				0	
	hazed				12	
common merganser	killed			0		
	hazed			4		
dabbling duck	killed			0		
	hazed			18		
diving duck	killed			0		
	hazed			12		
double-crested cormorant	killed			45	29	1
	hazed			390	592	1376
great-blue heron	killed		0	0	0	0
	hazed		50	202	44	5
herring gull	killed		28	16	0	7
	hazed		0	35	11	502
mallard	killed			0		
	hazed			15		
red-breasted merganser	killed			0		
	hazed			6		
ring-billed gull	killed	22	321	228	89	8
	hazed	40	900	935	360	1234
western grebe	killed			0		
	hazed			46		
Total	killed	22	411	319	240	29
	hazed	40	1004	1733	1579	4307

Table 3 – Yearly Summary of Species Hazed and Killed at The Dalles

Project	**The Dalles**

		Year					
Species	Data	1997	1998	1999	2000	2001	2002
california gull	killed	22	5	70	42	414	22
	hazed	56	0	1225	2735	5201	9726
caspian tern	killed				0	0	**1
	hazed				2	49	139
dabbling duck	killed				0		
	hazed				20		
double-crested cormorant	killed	23	55	80	68	25	0
	hazed	741	1159	875	2686	2117	2096
great-blue heron	killed	0	5		0	0	
	hazed	6	2		2	12	
herring gull	killed	1	2		33	2	18
	hazed	0	0		665	110	1446
red-breasted merganser	killed						
	hazed				95		
ring-billed gull	killed	23	92	493	124	70	29
	hazed	57	18	6109	9072	2966	4637
unidentified grebe	killed						0
	hazed						4
unidentified gull	killed	469	1292				
	hazed	2930	5046				
western grebe	killed	0	15	16	2	6	
	hazed	14	507	68	257	160	
Total	killed	538	1451	643	267	511	70
	hazed	3790	6225	8209	15277	10455	18048

** unintentional take caused by a misdirected pyrotechnic

Table 4 – Yearly Summary of Species Hazed and Killed at John Day

Project	**John Day**

		Year					
Species	Data	1997	1998	1999	2000	2001	2002
belted kingfisher	killed				0		
	hazed				6		
california gull	killed	22		234	155	446	55
	hazed	0		1614	4182	5396	4588
caspian tern	killed				0	0	0
	hazed				11	219	2
common merganser	killed	1					
	hazed	0					
dabbling duck	killed						
	hazed				12		
double-crested cormorant	killed	6	65	85	61	33	4
	hazed	161	177	121	1152	722	616
great-blue heron	killed		2		0	0	0
	hazed		1		22	12	1
herring gull	killed	2	8	1	44	16	23
	hazed	0	0	0	540	30	778
ring-billed gull	killed	13	260	1571	406	180	34
	hazed	54	59	11323	9591	3492	2739
unidentified grebe	killed						0
	hazed						654
unidentified gull	killed	206	1297		0		
	hazed	5134	9281		22		
western grebe	killed	66	58	64	2	24	
	hazed	997	378	38	1521	350	
Total	killed	110	393	1955	668	699	116
	hazed	1212	615	13096	17037	10221	9378

Table 5 – Yearly Summary of Species Hazed and Killed at McNary

Project	**McNary**

		Year					
Species	Data	1997	1998	1999	2000	2001	2002
american white pelican	killed		0				0
	hazed		80				333
bonaparte gull	killed						0
	hazed						478
california gull	killed		0				4
	hazed		80				615
caspian tern	killed		0				0
	hazed		80				330
common merganser	killed		0				
	hazed		80				
double-crested cormorant	killed		29	10	3	3	0
	hazed		184	6	0	0	512
herring gull	killed						0
	hazed						19
forster tern	killed		0				0
	hazed		80				63
ring-billed gull	killed	11	3	275		2	3
	hazed	0	1654	2912		0	3575
western grebe	killed					5	
	hazed					0	
unidentified gull	killed	0	0				
	hazed	150	165				
unidentified grebe	killed						15
	hazed						143
Total	killed	11	32	285	3	10	22
	hazed	150	2083	2918	0	0	6068

Table 6 – Yearly Summary of Species Hazed and Killed at Ice Harbor

Project	**Ice Harbor**

		Year				
Species	Data	1997	1998	1999	2001	2002
american white pelican	killed	0	0			0
	hazed	2	6			156
belted kingfisher	killed					0
	hazed					4
caspian tern	killed	0		0		0
	hazed	2		32		141
common merganser	killed					0
	hazed					2
double-crested cormorant	killed	92	26	49	0	1
	hazed	725	470	942	108	2396
great-blue heron	killed					0
	hazed					41
herring gull	killed					0
	hazed					22
osprey	killed			0		
	hazed			12		
ring-billed gull	killed	0	0	0	0	3
	hazed	1769	105	961	68	3757
unidentified grebe	killed					0
	hazed					22
unidentified gull	killed	0				
	hazed	1475				
Total	killed	92	26	49	0	4
	hazed	3973	581	1947	176	6541

Table 7 – Yearly Summary of Species Hazed and Killed at Lower Monumental

Project	Lower Monumental

		Year					
Species	Data	1997	1998	1999	2000	2001	2002
california gull	killed					4	
	hazed					0	
caspian tern	killed					0	
	hazed					3	
double-crested cormorant	killed		2	5	0	5	0
	hazed		9	19	28	535	587
great-blue heron	killed						0
	hazed						3
ring-billed gull	killed	2	12	3	1	34	84
	hazed	790	230	1174	1335	2798	10653
Total	killed	2	14	8	1	43	84
	hazed	790	239	1193	1363	3336	11243

Table 8 – Yearly Summary of Species Hazed and Killed at Little Goose

Project	Little Goose

		Year			
Species	Data	1999	2000	2001	2002
double-crested cormorant	killed		5		
	hazed		0		
ring-billed gull	killed	111	135	105	280
	hazed	1030	1589	852	1269
Total	killed	111	140	105	280
	hazed	1030	1589	852	1269

Table 9 – Yearly Summary of Species Hazed and Killed at Lower Granite

Project	Lower Granite

		Year				
Species	Data	1998	1999	2000	2001	2002
double-crested cormorant	killed	25				
	hazed	0				
ring-billed gull	killed		70	12	19	89
	hazed		1716	1899	829	1624
Total	killed	25	70	12	19	89
	hazed	0	1716	1899	829	1624

Table 10 – 5-Year (1997-2001) Summary by Month of Species Hazed and Killed at All Projects

Year (All)

Project (All)		Month												
Species	**Data**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Grand Total**
american white pelican	Killed													
	Hazed					2	6							8
belted kingfisher	Killed													
	Hazed					7								7
california gull	Killed	2	2	9	136	384	490	310	193	29			73	1628
	Hazed	1		56	1150	3306	4108	4345	1124	543	1111	4404	959	21107
caspian tern	Killed													
	Hazed				22	16	10	98	135	49				330
common merganser	Killed				1									1
	Hazed					4							80	84
dabbling duck	Killed													
	Hazed					50								50
diving duck	Killed													
	Hazed					12								12
double-crested cormorant	Killed	114	37	41	66	181	70	12	13	95	28	35	137	829
	Hazed	1393	496	1150	858	2269	310	99	128	1490	2653	1402	1671	13919
great-blue heron	Killed				2	2		1			1		1	7
	Hazed	3	3	40		218	75	10		1		3		353
herring gull	Killed	6	3	4	12	29	5	9	22	6		20	37	153
	Hazed	2			140	157	148	273	317	50		304		1391
mallard	Killed													
	Hazed					15								15
osprey	Killed													
	Hazed				12									12
red-breasted merganser	Killed													
	Hazed					6						95		101
ring-billed gull	Killed	47	180	71	634	1740	1371	212	116	89	2	98	127	4687
	Hazed	716	233	317	6688	24710	15144	5071	1617	390	910	6438	4453	66687
unidentified gull	Killed				150	1875	452	415	156	95	37	62	22	3264
	Hazed	40	300	296	2944	14284	2080	1638	386	222	668	463	882	24203
western grebe	Killed	2	10	2	14	56	78	24	14	8	9	13	28	258
	Hazed	113		7	348	424	588	81	28	88	1181	1222	256	4336
Total Killed		171	232	127	1015	4267	2466	983	514	322	77	228	425	10827
Total Hazed		2268	1032	1866	12162	45480	22469	11615	3735	2833	6523	14331	8301	132615

Table 11 – 5-Year Summary by Month of Species Hazed and Killed at Bonneville

Year	(All)											
Project	**Bonneville**	Month										
Species	Data	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Dec**	**Grand Total**
belted kingfisher	Killed											
	Hazed					1						1
california gull	Killed	2	1	2	52	48			43	4	62	214
	Hazed	1			120	213			310		54	698
caspian tern	Killed											
	Hazed								12			12
common merganser	Killed											
	Hazed					4						4
dabbling duck	Killed											
	Hazed					18						18
diving duck	Killed											
	Hazed					12						12
double-crested cormorant	Killed	5	4	6	27	25			3	3	1	74
	Hazed	80	80	341	209	114	20		22	16	100	982
great-blue heron	Killed											
	Hazed			40		190	66					296
herring gull	Killed	4				12					28	44
	Hazed				6	29			11			46
mallard	Killed											
	Hazed					15						15
red-breasted merganser	Killed											
	Hazed					6						6
ring-billed gull	Killed	19		17	37	265	203	44	15	23	37	660
	Hazed	61	15	40	198	749	451	479	110	40	92	2235
western grebe	Killed											
	Hazed					46						46
Total Killed		30	5	25	116	350	203	44	61	30	128	992
Total Hazed		142	95	421	533	1397	537	479	465	56	246	4371

Table 12 – 5-Year Summary by Month of Species Hazed and Killed at The Dalles

Year	(All)											
Project	**The Dalles**	Month										
Species	Data	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Dec**	Grand Total
california gull	Killed			1	29	136	168	161	41	11		553
	Hazed			20	720	1184	1646	2297	352	57	621	9217
caspian tern	Killed											
	Hazed						9	40	2			51
dabbling duck	Killed											
	Hazed					20						20
double-crested cormorant	Killed	58	23	20	12	5	3	12	4	49	21	251
	Hazed	987	239	762	150	24	12	77	103	1235	2165	7578
great-blue heron	Killed				2	2						5
	Hazed	3	2			6	3	4		1		22
herring gull	Killed		2			3	2	2	20	6		38
	Hazed	2			110	4	100	190	160	30		775
red-breasted merganser	Killed											
	Hazed											95
ring-billed gull	Killed	11	5	36	186	283	80	36	33	16		802
	Hazed	236	75	155	1230	2902	5528	2474	810	179	583	18222
unidentified gull	Killed				81	893	274	293	97	88		1761
	Hazed		61	74	987	3572	807	1413	297	166	235	7976
western grebe	Killed	2						9	6	4	2	39
	Hazed	113		3		34	50	53	16	3	505	1006
Total Killed		71	30	57	310	1322	527	513	201	174	23	3449
Total Hazed		1341	377	1014	3197	7746	8155	6548	1740	1671	4109	44962

Table 13 – 5-Year Summary by Month of Species Hazed and Killed at John Day

Year	(All)											
Project	**John Day**	Month										
Species	Data	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Dec**	**Grand Total**
belted kingfisher	Killed											
	Hazed					6						6
california gull	Killed		1	6	55	196	322	149	109	14		857
	Hazed			36	310	1909	2462	2048	462	486	490	11192
caspian tern	Killed											
	Hazed					1	1	58	121	49		230
common merganser	Killed				1							1
	Hazed											
dabbling duck	Killed											
	Hazed					12						12
double-crested cormorant	Killed	39	10	15	9	26	6		1	43	7	250
	Hazed	320	177	47	46	19	7	22	3	239	488	2333
great-blue heron	Killed							1			1	2
	Hazed		1			22	6	6				35
herring gull	Killed	2	1	4	12	14	3	7	2			71
	Hazed				24	124	48	83	146	20		570
ring-billed gull	Killed	12	167	18	304	680	929	132	68	50	2	2430
	Hazed	384	143	63	1932	6904	6714	2089	697	171	327	24519
unidentified gull	Killed				69	982	178	122	59	7	37	1503
	Hazed	40	239	222	1957	9317	1193	225	89	56	433	14437
western grebe	Killed		10	2	14	56	78	15	3	4	7	214
	Hazed			4	348	344	538	28	12	85	676	3284
Total Killed		53	189	45	464	1954	1516	426	242	118	54	5328
Total Hazed		744	560	372	4617	18658	10969	4559	1530	1106	2414	56618

Table 14 – 5-Year Summary by Month of Species Hazed and Killed at McNary

Year	(All)								
Project	**McNary**	Month							
Species	Data	January	February	May	June	August	November	December	Grand Total
common merganser	Killed								
	Hazed							80	80
double-crested cormorant	Killed	12					1	32	45
	Hazed	6						184	190
ring-billed gull	Killed	5	8	202	72		1	3	291
	Hazed	35		2110	767		752	902	4566
unidentified gull	Killed								
	Hazed						180	135	315
western grebe	Killed					5			5
	Hazed								
Total Killed		17	8	202	72	5	2	35	341
Total Hazed		41		2110	767		932	1301	5151

Table 15 – 5-Year Summary by Month of Species Hazed and Killed at Ice Harbor

Year	(All)				
Project	**Ice Harbor**	Month			
Species	Data	April	May	June	Grand Total
american white pelican	Killed				
	Hazed		2	6	8
caspian tern	Killed				
	Hazed	21	13		34
double-crested cormorant	Killed	11	123	33	167
	Hazed	256	1838	151	2245
osprey	Killed				
	Hazed	12			12
ring-billed gull	Killed				
	Hazed	325	2442	136	2903
unidentified gull	Killed				
	Hazed		1395	80	1475
Total Killed		11	123	33	167
Total Hazed		614	5690	373	6677

Table 16 – 5-Year Summary by Month of Species Hazed and Killed at Lower Monumental

Year	(All)					
Project	**Lower Monumental**	Month				
Species	Data	April	May	June	August	Grand Total
california gull	Killed		4			4
	Hazed					
caspian tern	Killed					
	Hazed	1	2			3
double-crested cormorant	Killed	2	2	3	5	12
	Hazed	197	274	120		591
ring-billed gull	Killed	14	32	6		52
	Hazed	857	5037	433		6327
Total Killed		16	38	9	5	68
Total Hazed		1055	5313	553		6921

Table 17 – 5-Year Summary by Month of Species Hazed and Killed at Little Goose

Year	(All)						
Project	**Little Goose**	Month					
Species	Data	March	April	May	June	July	Grand Total
double-crested cormorant	Killed		5				5
	Hazed						
ring-billed gull	Killed		66	219	66		351
	Hazed	33	714	2163	546	15	3471
Total Killed			71	219	66		356
Total Hazed		33	714	2163	546	15	3471

Table 18 – 5-Year Summary by Month of Species Hazed and Killed at Lower Granite

Year	(All)						
Project	**Lower Granite**	Month					
Species	Data	March	April	May	June	July	Grand Total
double-crested cormorant	Killed				25		25
	Hazed						
ring-billed gull	Killed		27	59	15		101
	Hazed	26	1432	2403	569	14	4444
Total Killed			27	59	40		126
Total Hazed		26	1432	2403	569	14	4444

APPENDIX H

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APPENDIX I

RESPONSES FROM CONSULTATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
UPPER COLUMBIA FISH AND WILDLIFE OFFICE
11103 EAST MONTGOMERY DRIVE
SPOKANE, WASHINGTON 99206

April 23, 2003

Peter F . Poolman
Chief, Environmental Compliance Section
Department of the Army
Walla Walla District, Corps of Engineers
201 North Third Avenue
Walla Walla, WA 99362-1876

Subject: Avian Predator Deterrent Program on the Lower Columbia and Snake River Dams in Klickitat, Benton, Franklin, Walla Walla, Whitman, Columbia and Garfield Counties, Washington; FWS Reference 1-9-02-I-0217, Cross Reference 1-9-00-SP-0142 (File # 350.0000)

Dear Mr. Poolman:

This responds to your February 25, 2003, letter requesting informal consultation on the Avian Predator Deterrent Program on the Lower Columbia and Snake River Dams in Klickitat, Benton, Franklin, Walla Walla, Whitman, Columbia and Garfield Counties, Washington. We understand that the projects involve implementation of the Avian Predation Environmental Assessment proposed alternatives for the protection of salmonids at U.S. Army Corps of Engineers (USACE) dams. Your letter, with a biological assessment (BA), was received in this office on February 25, 2003, and requested our concurrence with your determinations of effect for the bull trout, bald eagle, northern spotted owl, golden paintbrush, water howellia, Spalding's silene, and Ute ladies'-tresses.

Bull trout *(Salvelinus confluentus)* are present in all of the Lower Columbia and Snake River Dam areas, but the numbers are low. The project areas are also within proposed critical habitat boundaries for bull trout. The proposed projects would reduce the number of bird species that prey upon bull trout and other salmonids, which could benefit bull trout. However, bull trout numbers are so low in the areas of the dams that any beneficial impacts are not quantifiable. Based on information in the BA, the U.S. Fish & Wildlife Service (Service) concurs with Corps of Engineers determination of "may affect, but is not likely to adversely affect" for bull trout or proposed critical habitat.

Bald eagles (*Haliaeetus leucocephalus*) are rarely observed within the boundaries of the avian predator control areas. A low probability exists that an eagle could be impacted in the predator control area by striking an exclusion wire. Based on information in the BA, the Service concurs with the Corps of Engineers that the proposed action "may affect, but is not likely to adversely affect" bald eagles for the following reasons: 1) Mylar tape and ribbons are attached to many of the exclusion wires; 2) Target birds (which do not include eagles) will be shot or euthanized only by trained personnel; and 3) Birds that are shot or euthanized will be disposed of so they do not attract eagles or other raptores. Concurrence by the Service is contingent upon implementing the project as described in the BA.

You have requested the Service concur with your determination that the action, as proposed, will have no effect on northern spotted owls, golden Paintbrush, water howellia, Spalding's Silene, or Ute Ladies'-tresses, or critical habitat designated for northern spotted owl. Endangered Species Act (ESA) implementing regulations (50 CFR Part 402) do not specifically provide for Service concurrence with an action agency's determination that its proposed action will have no effect on listed species or critical habitat. However, in response to your request and based on the information you have provided to us in the BA, the Service agrees with your determination that the action, as proposed and analyzed, will have no effect on the aforementioned species or critical habitat.

This concludes informal consultation pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended (Act). This project should be re-analyzed if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this consultation; and/or, if a new species is listed or critical habitat is designated that may be affected by this project.

If you have further questions about this letter or your responsibilities under the Act, please contact Carrie Cordova of this office at 509-893-8022.

Sincerely,

Suzanne Audet

for Supervisor

c: WDFW, Regions 1,3 & 5
OFWO, Larry Rasmussen
OFWO, Joe Zisa